Food Shortages And Economic Institutions In The Democratic People's Republic of Korea

by

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A thesis submitted in fulfilment of the requirement for the degree of Doctor of Philosophy in Economics

University of Warwick, Department of Economics
January 2003

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Acknowledgement

During my study I am indebted to many people.

Above all, I would like to thank my two supervisors, Professor Mark Harrison and Doctor Sayantan Ghosal. In particular, Professor Harrison with his profound knowledge of the Soviet economy showed me various ways and viewpoints to look at the North Korean economy.

Concerning research data and materials I received great helps from many people in South Korea. I thank particularly those in Information Centre on North Korea, Ministry of Unification, who provided me with valuable North Korean literature, documents and data.

My great thanks should be given to my two fathers. My father who was born in North Korea and worked in South Korean government concerning North Korean issues has always inspired me to look at real North Korea. My personal interest in North Korea is largely influenced by him. My father-in-law also has encouraged my study and given great supports for my family life in England. Without them my study would not be possible.

I am also very grateful that my wife has always support me even though her life in England was not always comfortable.

Summary

This thesis aims to understand the 1987-99 food crisis in the DPRK. We begin by establishing the fact that the country faced several previous food shortages, including the 1945-46 urban food crisis, the 1954-55 rural food crisis and the 1970-73 food shortage, all of which triggered and motivated corresponding institutional changes in agriculture. And we find that in order to overcome repeated food shortages the country has developed several distinctive economic institutions such as administrative/quantitative production control in agriculture, state grain marketing, food rationing, central monopoly of agricultural trade and supplementary food supply institutions.

On the basis of this finding, we proceed into the analysis of the food crisis. Specifically, three controversial issues are examined. First, did it escalate into famine? If it did, how severe was the famine? Second, what was the causation of the famine? How did it unfold and what features did it have? Third, did the food crisis change the DPRK agriculture?

With respect to the first issue we estimate the number of excess deaths during the food crisis using official population figures. It shows that there existed a famine that claimed 688 thousand excess deaths in 1994-99. For the second issue we argue that the famine had several unique features. First it was 'absolute food availability decline (FAD) famine' in which no policies were feasible to prevent it. Second, it was urban famine where industrial population in the north-eastern part of the country suffered most. Third, it was 'famine-in-slow motion' that victims persistently weakened for a long period rather than perished in a short space of time, due to the mixed result of massive FAD and systematic national coping strategies. Concerning the final issue we show that it is not necessarily true that the food crisis genuinely changed the DPRK agriculture as generally conceived.

I. Introduction

This thesis examines food shortages and the development of agricultural institutions in the DPRK. It primarily intends to understand the country's recent food crisis and draw some lessons about its economic changes caused by the crisis. To do this we study how its agricultural institutions are organised and why they came into being. This study will show that the DPRK food crisis was the result of the country's rather unique agricultural institutions and thus it has quite different features from most other food shortages in market economies and even in other socialist countries.

Scope of problem

The DPRK food crisis in the 1990s has raised various international concerns. To those having humanitarian interests it seemed one of the greatest famines in human history in which millions of people might have died of starvation. To policy makers dealing with the DPRK issues it was a challenge and opportunity to embrace and change this isolated, but seemingly aggressive, country into a responsible member of international society. To researchers studying the DPRK economy it was the most compelling evidence that this only remaining Stalinist command economy has finally collapsed and so should change in order to survive. Reflecting those concerns, more than 2 million MT of international food aid was poured into the country between 1995 and 1998. And many western countries, including Great Britain, opened new diplomatic relations with the DPRK to support its economic reforms and new political relations with neighbouring countries such as South Korea (henceforth ROK), Japan and the US. It has been also reported that the DPRK is really changing due to the crisis. The first North-South Korean summit meeting was held in 2000, and the DPRK government has frequently announced its willingness to participate in the world economy and even introduce market mechanisms for its agriculture.

Despite the concerns, however, surprisingly little is known about the food crisis. We know that the country suffered extreme food shortages in the 1990s. But we do not know exactly when and why the shortages happened, how severe they were, how different they were from those in other countries, what consequences they had,

and even whether they have ended yet. The primary purpose of this thesis is to answer these questions.

Our starting point is a simple fact that food shortages in the DPRK were not unique in the 1990s. For the last five decades the country has experienced at least four different food shortages, all of which have been interestingly accompanied by corresponding institutional changes in agriculture. In the early 1970s, for instance, the DPRK authorities officially admitted the failure of agricultural production and reduced state food rations, which was immediately followed by the creation of so-called *Juche Nongbub* [*Juche* farming methods] that transformed the existing decentralised agriculture into the centralised current one. And this current agriculture has been reportedly decentralised again since the country began to suffer another food shortages in the 1990s. In other words, food shortages have triggered institutional changes in agriculture and at the same time agricultural institutions have prepared and featured food shortages.

To understand the recent DPRK food crisis, therefore, we consider three related working issues. One concerns the historical contexts in which food shortages and agricultural institutions have influenced each other. Another is about the main features of the recent food crisis. That is, how different is the crisis from those in other countries? And how was it affected by the current agricultural institutions? And the final issue is about the institutional changes caused by the crisis and their implications.

Composition of Study

This thesis consists of four parts. The first part that comprises chapter 2 studies basic relation between food shortages and agricultural institutions in the DPRK. In this part we find that the current DPRK agricultural institutions are organised in order to resolve the country's on-going food shortages. And this finding provides the basis for the discussion of the recent DPRK food crisis in the third part of this thesis.

The second part concerns the historical evolutions of agricultural institutions in relation to historically reported food shortages. Chapter 3 examines the early agricultural institutions in 1945-53 and discuses their relation with the 1945-46 urban food crisis. Chapter 4 studies the appearance of new agricultural institutions in 1957-

62, which primarily constitute the current institutions, showing that they were the results of the 1954-55 food crisis and the ongoing agricultural resource shortage after the Korean War. And chapter 5 deals with the period of 1973-87, the final completion stage of the current agricultural institutions, during which the central government established *Juche Nongbub* and centralised agricultural planning after the 1970-73 food shortages.

The third part of the thesis discusses the DPRK food crisis in the 1990s. To do this, chapter 6 presents a brief chronicle of the crisis and addresses three controversial issues surrounding it. First, did the food crisis develop into famine? If so, how severe was the famine? Second, what were the main features of the famine? Was it different from those of other countries? Third, did the food crisis change the DPRK agriculture? Of these issues, chapter 7 deals with the issue of the existence of the famine. In this chapter we find that the country faced a national famine that claimed 688 thousand excess deaths between 1994 and 1999. On the basis of this finding, chapter 8 discusses the detailed aspects of the famine, including its causation, development paths, main victims and national coping strategies. In this chapter we argue that the famine was rather unique in the sense that it was 'absolute FAD (food availability decline) famine', 'urban famine' and 'famine in slow motion', discussing how these features were generated by the current DPRK agricultural institutions. Chapter 9 examines the institutional changes induced by the food crisis, showing that it is not necessarily true that the country has genuinely changed or really reformed its agricultural institutions.

The final part comprising chapter 10 summarises the discussions of the previous chapters and presents a brief remark on the limit of this thesis.

Data and literature

A common belief among the DPRK students is that official DPRK statistics and literature are extremely hard to obtain and even available few are not reliable. This is perhaps the reason why most previous studies about the DPRK economy avoided using statistics or relied on the statistics and information independently made by outside institutions and researchers. We do share this belief in some degree. Nonetheless we would point out that, as far as the DPRK agriculture, particularly its

institutions and food shortages, are concerned, official statistics and literature are not as rare as generally conceived. Indeed this thesis is heavily dependent on official DPRK statistics and literature.

Consider the availability. In case of agricultural institutions there are four kinds of DPRK literature (information) available. First, the country's economic decrees are available. Those between 1945 and 1967 are compiled by the ROK government,[1] and some important decrees between 1946 and 1961 are also available from such DPRK journals as *Chosun Joongang Nyungam* [DPRK Central Yearbook].[2] Although no decrees are available since the 1960s, it should not cause great difficulties because the DPRK agricultural institutions have not fundamentally changed since, except for the fact that *Juche Nongbub* was introduced in the 1970s. Second, official agricultural history is available. Two history textbooks, *Chosun Jonsa* [The whole history of Korea] Vol.22-34 and *Chosun Nongupsa* [The agricultural history of Korea] vol.4, constitute one source. And Kim Il Sung's addresses and articles in *Kim Il Sung Jojakjip* [Collected Works] provide another source. Third, some DPRK documents about agricultural policies are available. The Korean Workers' Party Conference documents from its first conference to the fifth are compiled by the ROK government, being made recently available to public. There are also the DPRK Supreme Assembly documents from 1947 to 1982. Fourth, various individual DPRK books and papers have been available too.

Concerning food shortages there are two different official statistics available. One is the statistics released in official publications such as *Chosun Joongang Nyungam* between 1946 and 1962. Though not abundant and detailed, they cover a wide range of issues from population to grain production. Another is the statistics that the DPRK government has submitted to various UN aid organisations since 1995. The submitted statistics normally cover the period from 1990 to present, providing relatively detailed information about population, food production, distribution and trade etc. Of course, official statistics are missing for the period of 1963-1988. Yet this difficulty does not pose a serious constraint when we focus on the DPRK food

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[1] These decrees are available from *Bukhan Bubryungjip* [Collected North Korean Laws], edited by Jeong Gyung Mo and Choi Dal Gon, Seoul, *Daeryuk* Research Institute, 1990. The economic decrees used for the thesis are from this source unless otherwise stated

[2] The decrees between 1946 and 1956 are also available from the Korean Workers' Party Central Committee, Gyuljongjip [Decrees], various years.

crisis in the 1990s, and when we use other non-official DPRK statistics such as media-released-figures as well as outside estimates.

What about the reliability? The available DPRK literature such as economic decrees does not seem to raise a serious credibility concern. Yet, the reliability of the official DPRK statistics could matter. It is controversial how accurate the statistics are and even whether they are intentionally falsified or not.[3] The difficulty is that there are no enough statistics and information to evaluate this reliability problem.

Considering this difficulty, we utilise official DPRK statistics and literature in the following manners. First, we use all the available statistics and literature. Second, however, in case of the statistics we normally use them only to identify trends, giving little attention to the absolute levels of the figures. Third, when we use the statistics, we also consider other related figures made independently by outside institutions and researchers in order to check out the reliability of the trends that the statistics yield.

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[3] For instance, see Appendix II about official DPRK grain statistics

II. Food Shortages and Agricultural Institutions in the DPRK

2.1. Introduction

We begin by describing current agricultural institutions in the DPRK and examining why and how the institutions came into being. In its history of around five decades the country has experienced four major food shortages, including the current food crisis, all of which have brought about fundamental changes in agricultural institutions. In other words, the DPRK agricultural institutions have evolved so as to resolve the country's repeated food shortages, and the final outcome of this evolution is the current institutions. To our knowledge, however, there is no detailed previous research about the DPRK agricultural institutions. Thus, this basic relation between the institutions and food shortages is not widely known.[4]

To put the current agricultural institutions into the context, therefore, we ask three questions. First, why has the country been vulnerable to food shortages? Second, what has been the idea to resolve that vulnerability? Third, how has the idea been materialised in the form of agricultural institutions?

To answer these questions the remaining parts of this chapter are organised as follows. Section 2.2 reviews the historically reported food shortages in the DPRK, finding that the country has been vulnerable to periodic food shortages ironically due to its own strategy to increase food production. On the basis of this finding, we describe the current DPRK agricultural institutions in section 2.3. We particularly focus on the underlying idea of the institutions that the central government should control all economic activities concerning food production, distribution, consumption and trade in order to maintain national food balance. Section 2.4 considers relation between food shortages and agricultural institutions in historical context. In this section we find that all the DPRK food shortages happened with sudden reduction in agricultural resources

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[4] All previous studies about the DPRK agricultural institutions are very brief introductory ones. For instance, see Chung (1974: ch.2); Scalapino and Lee (1972: ch.13); Ko Seung Hyo (1993: p.209-219); Ko Ryo Jung (1988:p.122-157); Kim Woon Keun (1996a:p.93-106) etc.

and so agricultural institutions have developed in an attempt to increase agricultural resource supply. Finally section 2.5 summarises the discussion of this chapter.

2. 2. The DPRK Food Problem

Historically the DPRK agriculture has emphasised foodgrain production in order to achieve national food self-sufficiency. Indeed its food production had increased significantly, exceeding population growth at least until the mid 1980s. Despite this increase however the country has faced repeated food shortages. In this section we consider why it has been vulnerable to food shortages.

2.2.1. Periodic Food Shortages

It is in 1995 that the DPRK government admitted its precarious food situation to outside world for the first time in its history, appealing for international food aid. But food shortages are not recent in the DPRK. Indeed the country has experienced food shortages almost periodically. For instance, there was an urban food shortage in the winter of 1945-46 shortly after the communists took over the country [see table 2-1]. In the winter of 1954-55 another food crisis took place in which defectors reported the occurrence of small-scale famine in rural areas. Between 1969 and 1972 it was officially admitted that grain production failed to catch up population growth, which was soon followed by the reduction in food rations and the introduction of birth control policy. And a well-known food crisis occurred in the 1990s, which has been reportedly still going on.

A common feature of the DPRK food shortages is that they happened with external shocks, including natural disasters, war, political conflicts with neighbouring countries and sudden population movements, which led to either temporal collapses in agricultural production or unexpected increase in food demand or both. For instance, the 1954-55 crisis was preceded by the production fall in 1954 due to deteriorated agricultural conditions after the Korean War, being triggered by the harsh state grain collection campaign between November 1954 and February 1955 to meet increasing

urban food demand generated by post-war population movement into cities. The food shortage in the early 1970s was related to both military confrontation with the US

Table 2-1. Historically Reported DPRK Food Shortages

	Scale	Grain Production	Causation	Source
In the winter of 1945-46[a)]	Unknown	fell by 10-50 percent, compared to normal level	confusion after the liberation from the Japanese rule etc	DPRK literature, DPRK cabinet decrees etc
In the winter of 1954-55[b)]	small scale rural famine	lowest since 1948	Ruined agriculture after the Korean War	Defector statements
1970-73[c)]	Unknown	the production in 1969-72 failed to catch up population growth	bad weather, increasing military build-up, industrial stagnation	DPRK literature
Sine 1987[d)]	National famine in 1994-99	unknown for 1987-88, but kept falling since (the production of 1997 was less than one third of the 1993 level)	Collapse of trade with the USSR, industrial stagnation, bad weather etc	Official admittance of food shortages, international food aid since 1995

Note: For details, see section 3.2.1 for a, section 4.2.1 for b, section 5.2.1 for c, and chapter 6-8 for d.

(and the ROK), which worsened labour shortages in agriculture, and decelerated industrial development. Bad weather and rapid population growth also worsened food balance. The food shortage in the 1990s is similar. Due to the disintegration of the USSR the country suffered agricultural input shortages, which were worsened by ongoing industrial stagnation. Further, there were a great flood in 1995 and subsequent natural disasters.

It is not rare in many developing countries facing long-term agricultural stagnation that external shocks cause production failures, leading to food shortages. Yet the DPRK does not seem to fall into this category. Let us look at table 2-2. Between 1947 and 1993 the DPRK population grew around two times while its grain production increased almost five times. Agricultural machinery and fertiliser supply also increased sharply. And this progress was accompanied by the corresponding industrial development, as illustrated by a drastic increase in industrial population share. Of course the progress was suddenly transformed into total collapse of agriculture in the

mid/late 1990s.[5] Nonetheless it seems difficult to say that the DPRK has suffered a long-term agricultural stagnation throughout its history.

Why has then the country been vulnerable to repeated food shortages? To answer this question we consider three factors of the DPRK agriculture: the goal, constraints and development strategy.

Table 2-2. The DPRK Agriculture: 1946 vs. 1993

	1946(A)	1993(B)	A/B
Population (million)			
Total	9.25	21.21	2.29
(agriculture)	6.86	8.02	1.17
(Non-agriculture)	2.39	12.50	5.23
Sown Area (1,000 ha)			
Total	1934	N.A	-
(rice)	388	579**	1.49
(Maize)	174	653**	3.75
Grain Production (1000 MT)			
Total	1898	9000	4.74
(rice)	1052	4750	4.51
(Maize)	156	3940	25.26
Per Capita Production (kg)	487	4243	8.71
Agricultural Input			
Number of tractors in use	0	75000	-
Chemical Fertiliser (ton)	260*	781000	3004

* 1948 figure, ** 1995 figure

Source) 1. For 1946 (& 48), *Chosun Joongang Nyungam*, various years.
2. For the 1993 population, DPRK Central Bureau of Statistics (1995)
3. For the 1995 sown area, DPRK's submission to FAO/WFP (6 Dec 1996)
4. For the 1993 grain production (total), Pyongyang media announcement available from Hirata (1998)
5. For the 1993 grain production (rice and maize), DPRK's submission to DPRK/UNDP (1998a)
6. For the number of tractors and chemical fertiliser in 1993, FAO statistical Database

[5] For the collapse of grain production in the 1990s, see chapter 6

2.2.2. Goal, Constraints and Development Strategy in Agriculture

It is well known that the DPRK has pursued an autarkic economy called *Juche Gyungje* [self-reliance economy].[6] In order for this economy to operate properly, food self-sufficiency is necessary. Indeed national food self-sufficiency has been the utmost goal of the DPRK agriculture since the country's independence in 1945.[7]

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[6] For *Juche Sasang* [Juche Idea], the leading ideology of the DPRK, see Kim Jong Il (1982); DPRK Social Science Academy (1985); Park Il Bum (1985); Kim Chang Won (1985). For the official explanation of *Juche Gyungje*, see Park Young Keun et al (1992).

[7] To show the importance of national food self-sufficiency, we construct DPRK's food self-sufficiency ratio (FSR) using both officially released figures and FAO data set between 1960 and 1997 as below. As expected FSR had been usually as high as above 95 percent until the 1980s, demonstrating that not only the country had pursued but also actually achieved national food self-sufficiency before the recent food crisis in the 1990s occurred. Using the USDA data set, Nam Sung Wook (1998) has also reached the same conclusion.

[Grain Import, Production and Self-sufficiency Ratio in the DPRK: 1960-97]

(1000 MT)

		60	61	62	63	64	65	66	67	68	69
Net Import	(A)	53	455	87	59	27	187	344	393	84	112
Production	Official - (B)	3803	4830	5000	5000	5000	na	4405	5110	5672	na
	FAO - (C)	Na	3583	3725	4053	4212	3707	4073	3787	3662	4378
Self-Suff.	(B)/[(A)+(B)]	98.63	91.39	98.29	98.84	99.46	na	na	92.76	92.87	98.55
Ratio (%)	(C)/[(A)+(C)]	Na	88.73	97.72	98.57	99.36	95.21	92.22	90.61	97.77	97.50

		70	71	72	73	74	75	76	77	78	79
Net Import	(A)	239	187	421	1113	772	93	137	-70	-262	76
Production	Official - (B)	Na	na	na	5343	7000	7700	8000	8500	7870	9000
	FAO - (C)	4364	4499	4309	4816	5068	5246	5490	5798	5798	6006
Self-Suff.	(B)/[(A)+(B)]	Na	na	na	82.76	90.07	98.81	98.31	100.8	103.4	99.16
Ratio (%)	(C)/[(A)+(C)]	94.82	96.01	91.09	81.22	86.79	98.26	97.56	101.2	104.7	98.75

		80	81	82	83	84	85	86	87	88	89
Net Import	(A)	283	456	375	230	50	0	153	438	838	376
Production	Official - (B)	na	na	na	na	10000	na		10059		9490
	FAO - (C)	5752	6254	6523	6707	7128	7096	7650	7558	7517	7824
Self-Suff.	(B)/[(A)+(B)]	na	na	na	na	99.50	na		95.83		96.19
Ratio (%)	(C)/[(A)+(C)]	95.31	93.20	94.56	96.68	99.30	100.0	98.04	94.52	89.97	95.41

		90	91	92	93	94	95	96	97
Net Import	(A)	553	1560	1149	1544	555	1010	1107	1451
Production	Official - (B)	9000	8900	8800	9000	7100	3500	2500	2700
	FAO - (C)	8071	8836	8681	9137	7215	3787	2596	2866
Self-Suff.	(B)/[(A)+(B)]	94.21	85.09	88.45	85.36	92.75	77.61	69.32	65.05
Ratio (%)	(C)/[(A)+(C)]	93.58	84.99	88.31	85.55	92.86	78.95	70.11	66.40

Initially food self-sufficiency was pursued for an economic reason to encourage domestic food supply under the situation that traditional food trade between North and South Korea collapsed. In the 1950s and 60s it was reinforced for military and political reasons. The Korean War ended without any peace treaty: hence the country should prepare for the possible reoccurrence of the war. In addition, intensified US economic blockage made it difficult for the country to access to many food exporters in international market. In the early 1970s, as so-called *Juche Idea* was announced as the leading guideline of the country, an ideological reason appeared: the principle of food self-sufficiency was officially incorporated into *Juche Gyungje*. Since the mid 1970s food self-sufficiency has been enforced by another economic reason that the country defaulted in international financial market.

But the agricultural conditions of the DPRK have not been favourable for food self-sufficiency. Above all, its natural and geographical conditions have imposed a serious constraint on agriculture, particularly on foodgrain production. Of total land of 12 million hectares, only about 14 percent is arable while somewhat 80 percent is mountainous.[8] Because the country is exposed to cold winds from Siberia, growing season is short and the possibility of cold snaps during growing season is real. Annual rainfalls are volatile, leading to frequent floods and droughts. Traditionally, therefore, the production of main foodgrains such as rice, which requires long summer growing season and enough rainfalls, had been of relatively little importance in many northern provinces of Korea peninsular.

Economic conditions have been unfavourable, too. The DPRK inherited an underdeveloped agriculture from the Japanese rule in which more than 70 percent of farm households had not been self-sufficient on food.[9] Moreover, as in many other socialist countries, the new DPRK leadership attempted to industrialise the country as rapidly as possible. In consequence, agricultural investment has been always under stress while there has been a permanent increase in urban food demand. As shown by table 2-2, the share of non-agricultural population increased from 26 percent of total

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Source) 1. For official grain production, see table 6-3 in chapter 6
2. For others, FAO statistical database

[8] Kim, Lee & Sumner (1998: p. 521-522)
[9] DPRK Social Science Academy, *Chosun Jonsa [The Whole history of Korea* : henceforth *Chosun Jonsa]* Vol. 24, p.129

population in 1946 up to 59 percent in 1993, and this trend was not reversed in any single year.

Political environment has imposed another constraint. Since the Korean War the country has faced political and military confrontations with the ROK and the US: hence sudden resource shifts from agriculture to military sector have been real and frequent.

Given these constraints, the DPRK authorities have developed several interesting agricultural policies to achieve national food self-sufficiency.[10] First, the authorities have reorganised agriculture to maximise the share of foodgrain production. Regional food self-sufficiency has been the main policy to expand foodgrain production.[11] All farm households have been enforced to be self-sufficient on food. And local administrators in provinces and counties who have actually controlled farm operations have been given the responsibilities to feed urban population in their jurisdictions.

Secondly, to maximise the yield of foodgrain production the authorities have encouraged producers to specialise in only two high-yield grain items, rice and maize [see the change in crop composition presented by table 2-2].

Thirdly, the authorities have pursued to maximise agricultural input supply for foodgrain production. A series of land expansion programs have been launched throughout the country's history, and so-called four agricultural modernisation programs, including mechanisation, electrification, irrigation and chemicalisation, have been in the centre of all agricultural policies.

Fourthly, the authorities have emphasised the positive linkage between industry and agriculture in order to maximise non-labour input supply in agriculture.[12] When industry was underdeveloped, agricultural resources were transferred to industry. In this case, however, the priority in industry was given to those sectors producing agricultural inputs such as agricultural machinery, fertiliser and chemicals etc. By contrast, when industrial development accelerated, industry financed state investment in agriculture, including massive-scale land expansion programs and irrigation projects.

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[10] For the detailed discussion of the strategy, see section 6.3 in chapter 6
[11] Park Young Ho (1994) p.224-225
[12] Kim Chun Sung (1989: p. 20) and DPRK Social Science Academy (1973:p.16-17)

2.2.3. The DPRK Food Problem

As shown by table 2-2, these policies had made significant progresses in agriculture by the 1980s. At the same time however they have generated a structural food problem too. Perhaps the most adverse effect of the policies is that foodgrain production is increasingly subject to unfavourable natural conditions. To increase arable land, for instance, forests have been destroyed and mountains cut into terraced fields. In consequence, natural resistance against floods and droughts has gradually weakened.[13] Mono cropping of rice and maize has destroyed traditional double/triple cropping of other grains that had prevented soil exhaustion: hence land conditions also have been deteriorated. Furthermore, as foodgrain production has spread to colder and more mountainous areas, it has been vulnerable to even a small change in weather or other natural conditions.

To prevent this adverse effect the authorities have emphasised non-labour input supply. For instance, irrigation facilities have been provided even to terraced fields in mountains. More chemical fertilisers have been mobilised to increase grain yield against deteriorating soil conditions. More agricultural machinery and chemicals have been utilised to cultivate frozen land and protect seeds from coldness. But the supply of non-labour inputs has been easily disrupted by external shocks such as industrial stagnation, political tensions with neighbouring countries and the cessation of import from other socialist countries etc.[14] It means that foodgrain production itself has been increasingly vulnerable to external shocks.

Moreover, the economy has become more unaffordable to even temporal stagnation in agriculture. The DPRK agricultural policies institutionalise or presuppose persistent labour shifts from agriculture to industry, and so urban food demand has been on permanent increase. Therefore, when there is a disruption in foodgrain production, the economy falls easily into food crisis.

From the above discussion we can identify a structural food problem in the DPRK. To achieve food self-sufficiency the country focused on foodgrain production, which was heavily dependent on non-labour input supply in agriculture. As the input

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[13] Lee Shin Wha (1997: p.7)

supply has increased, however, natural conditions for foodgrain production have been deteriorated while urban food demand has continually risen. When the input supply increases fast enough, the adverse effects of the natural degradation and increasing food demand on the country's food situation might be mitigated. But the input supply has been volatile due to unstable economic and political factors such as industrial stagnation and military build-up etc. In consequence, the country's food situation has been structurally vulnerable to the shocks that have adverse impacts either on natural conditions or on agricultural input supply. Historically this vulnerability did not disappear even when foodgrain production had a long-term increasing trend, generating periodic food shortages.

2.3. Current Agricultural Institutions

Current agricultural institutions in the DPRK are designed to solve the country's food problem.[15] The underlying idea of the institutions is simple but powerful: the central government should and could control all economic activities concerning food production, distribution, consumption and trade in order to keep national food self-sufficiency and prevent food shortages at the same time. Owing to this idea the institutions have highly centralised and administrative features. In this section we summarise the features as quantitative planning in production, state grain marketing in

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[14] According to FAO and WFP, for instance, chemical fertiliser consumption in the DPRK fell by almost 90 percent in 1990-96 due to the combined effects of industrial stagnation and the breakdown of the USSR (FAO/WFP: 29 June 1999)

[15] We define 'the current institutions' as those that had dominated the DPRK agriculture until the country faced the recent food shortages in the late 1980s/90s. From 1987 to present, we shall see in chapter 9, the DPRK authorities have several emergency measures to increase domestic food production and consumption, which are quite contradictory to the existing agricultural institutions. But the problem is whether we can call those measures 'institutional changes'. Let us take an example. In 1957 the authorities announced an economic decree to prohibit private grain trade and so since then there had been no grain markets until the 1980s [see section 4.3.2.1 in chapter 4]. In the early 1990s, however, private grain trade was effectively tolerated in farmers' markets; and the ROK Ministry of Unification (Dec 1999) showed that the DPRK food refugees and defector families had relied on private grain trade in farmers markets for 6-70 percent of their total food consumption in the mid/late 1990s. But there has been no official approval for private grain trade: hence it is still illegal. Moreover, the authorities frequently stopped private grain trade in farmers markets when food situation improved even temporarily. It seems therefore difficult to say that private grain trade was newly institutionalised in the DPRK in the 1990s. Rather it seems more appropriate to conclude that the DPRK institutions has still prohibited private grain trade but they have not worked properly because the country has been facing severe food shortages. In this reason we regard the agricultural institutions before the recent food shortages as 'the current institutions' in the DPRK.

distribution, food rationing in consumption, central monopoly in trade, and the existence of supplementary food supply channels

2.3.1. Administrative Production Control: Quantitative Planning Institutions

The current institutions stand on a belief that the central planner could and should plan farm outputs in quantitative terms. The primary objective of quantitative planning is to increase foodgrain production in such speed to balance planned increase in food demand. The imposition of output targets and administrative resource allocation by higher-authorities are two major policies to control farm outputs. The operation of production unit is tightly controlled and supervised by state agricultural agencies that are organised along administrative hierarchies. And the performance of both production unit and state agencies is assessed according to their fulfilment of output targets.

cooperative farm and CCMC

Agricultural production is carried out by cooperative farms. Although state farms are also engaged in agricultural production, they largely specialise in other products than grain such as industrial crops, fruits and animals, having relatively little importance in food production. A cooperative farm is established to incorporate all farm households, land and other agricultural and social properties in village. Formally it is owned by member households, not by the government: hence the member households are distributed farm outputs, not receiving salary from the government. But it does not mean that the farm operates independently. On the contrary, all the farm decisions from crop selection to output distribution and to farm marketing are made by County Cooperative Management Commission [CCMC], state agricultural agency in county.

According to official terminology CCMC constitutes management unit [*gyungyong danwi*] in agriculture while cooperative farm is production unit [*sangsan danwi*].[16] It means that CCMC is effectively running cooperative farm. Indeed CCMC has all the powers and responsibilities to operate cooperative farm, including: 1) allocation of state output targets; 2) supplying all necessary resources and technologies

for farm operation; 3) supervising all farm activities such as production, consumption, income distribution, marketing, financial activities and so forth. In this sense the relation between CCMC and cooperative farm is similar to that between management board and department/factory in a large-scale state enterprise. In order to meet state output targets CCMC (management board) allocates specified tasks (roles) and resources among cooperative farms (departments), supervising and monitoring their operations. Cooperative farms (departments) are responsible for their performance to CCMC (management board), but at the same time CCMC is also responsible for the performance of county (of the enterprise) to its higher authorities.

Three official explanations are offered to the reasons why CCMC controls cooperative farm. First, CCMC owns all state assets in county that are necessary for cooperative farm to operate, including machine tractor station, water supply station, farm equipment repair stations, milling station, state shops and so forth. Second, CCMC provides all the necessary technical supports for production from new technologies and seed varieties to the operation of farm machinery and the supply of agricultural specialists. Third, it is necessary to harmonise commercial interests of cooperative farm with the national interest of food self-sufficiency.[17]

The basic task of CCMC (and cooperative farm) is to meet various state output targets. Of them, the most important is grain production target. Every CCMC is categorised into four different grades, which give different financial and administrative rewards, according to grain production level.[18] Although CCMC bureaucrats are state officials, their salaries are also affected by the level of grain production in their jurisdictions.

PREC and regional planning

A difference between agriculture and industry is that agricultural production is primarily biological process whereas industrial production is technical/mechanical process. Due to this difference quantitative planning is likely to entail more errors in

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[16] For the relation between CCMC and cooperative farms in the DPRK agricultural planning institutions, see chapter 4 of the Korean Workers Party Publisher (1963).
[17] Oh Dae Ho (1989), p.66-67
[18] Cabinet decree no. 116, On rewarding honours to co-operative farms, cities, townships (districts) that sell more grains to the state, 20 July 1961

agriculture. For instance, it is more difficult in agriculture to define technical input-output relations that are necessary for quantitative planning. It is even impossible in agriculture to plan some important input factors such as weather.

Perhaps this difficulty is one of reasons why agricultural production in the DPRK is organised in such a large scale i.e. at county/village level.[19] But the most important measure taken to resolve the difficulty of quantitative planning in agriculture is to establish regional planning institutions in which provincial administrators control agricultural planning and resource allocation independently. Regional planning institutions with real powers are particularly important because the country's natural and geographical conditions vary greatly by regions from flat South West with mild weather to mountainous North East with cold weather. Indeed all agricultural planning related powers and functions that the central government had exercised were transferred to Provincial Rural Economic Commission (PREC), state agricultural agency in province, in the early 1960s. Since then, as far as agriculture is concerned, PREC has operated like a central planner in each province.

PREC functions as follows.[20] First, based on the planning guidelines of State Planning Commission (SPC), the central planning agency in Pyongyang, it plans farm outputs, imposes output targets on CCMC and cooperative farms, and monitors their performance. Second, it establishes scientific and technological standards such as relevant technologies, seed varieties, crop selections by land conditions, types of fertilisers and so forth. Third, it supervises resource allocation in agriculture. To do this it owns 'provincial resource supply company', exclusively supplying agricultural inputs to counties and cooperative farms.

By contrast, Agricultural Commission, agriculture ministry in Pyongyang, has little power to influence agricultural planning and resource allocation. Its role is confined to organising research projects with national importance and providing the cabinet with professional advice for long-term agricultural development. It is true that

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[19] In fact the DPRK authorities have believed that in order to minimise planning errors in agriculture its biological production process should be transformed into more industry-like technical process governed by such mechanical factors as machinery, electricity, chemicals and artificial water supply. It has been also emphasised that the basic planning unit in agriculture should be as self-sufficient as possible so that, even when there are planning errors by higher authorities, the adverse effects could be minimised (Ahn Hyuk Jin, 1993: pp. 25-27). In this respect the large scale of planning unit has been a necessary condition for the DPRK agricultural planning.

[20] For details, see section 4.2.2 in chapter 4.

PREC should report to Agricultural Commission. In practice however PREC directly belongs to the cabinet, operating like a separate central ministry.

As mentioned above, the primary objective of agricultural planning is to increase food production so as to meet planned food demand. But how does the government keep the balance when provincial administrators with different natural and geographical conditions control agriculture separately? The answer is simple: the central government imposes food self-sufficiency on every province and makes PREC responsible for it. In fact, as we shall discuss in chapter 4, regional food self-sufficiency has been one of the most important policies to increase the country's food production and achieve national food self-sufficiency since the early 1960s. To realise regional food self-sufficiency PREC has three specified tasks: 1) maximising two major foodgrain (rice and maize) production; 2) developing new grain varieties fitted to local conditions; 3) maximising the amount of marketed grain and bringing all the marketed grain under state control.

Juche Nongbub and central control

In terms of administrative organisation the DPRK agriculture is largely decentralised. Nonetheless, the intervention of the central government has been paramount. For instance, the standard charter of cooperative farm states that cooperative farm must execute the commands of the DPRK leaders, Kim Il Sung and Kim Jong Il, with the first priority, suggesting that the central government could and does control even daily farm operation.[21] Given seemingly limited roles of Agricultural Commission, however, how does it make this intervention?

There are two ways the central government controls both local administrators and cooperative farms: *Juche Nongbub* and the unified and detailed planning.[22]

Juche Nongbub refers to nationally standardised farming processes in the DPRK. As its literal meaning indicates, it entails certain technical aspects in which traditional farming skills are mixed with new agricultural technologies. But the most important feature of *Juche Nongbub* is that it decomposes complicate biological farming processes into numerous simple labour processes [*sebu gongjung*: detailed

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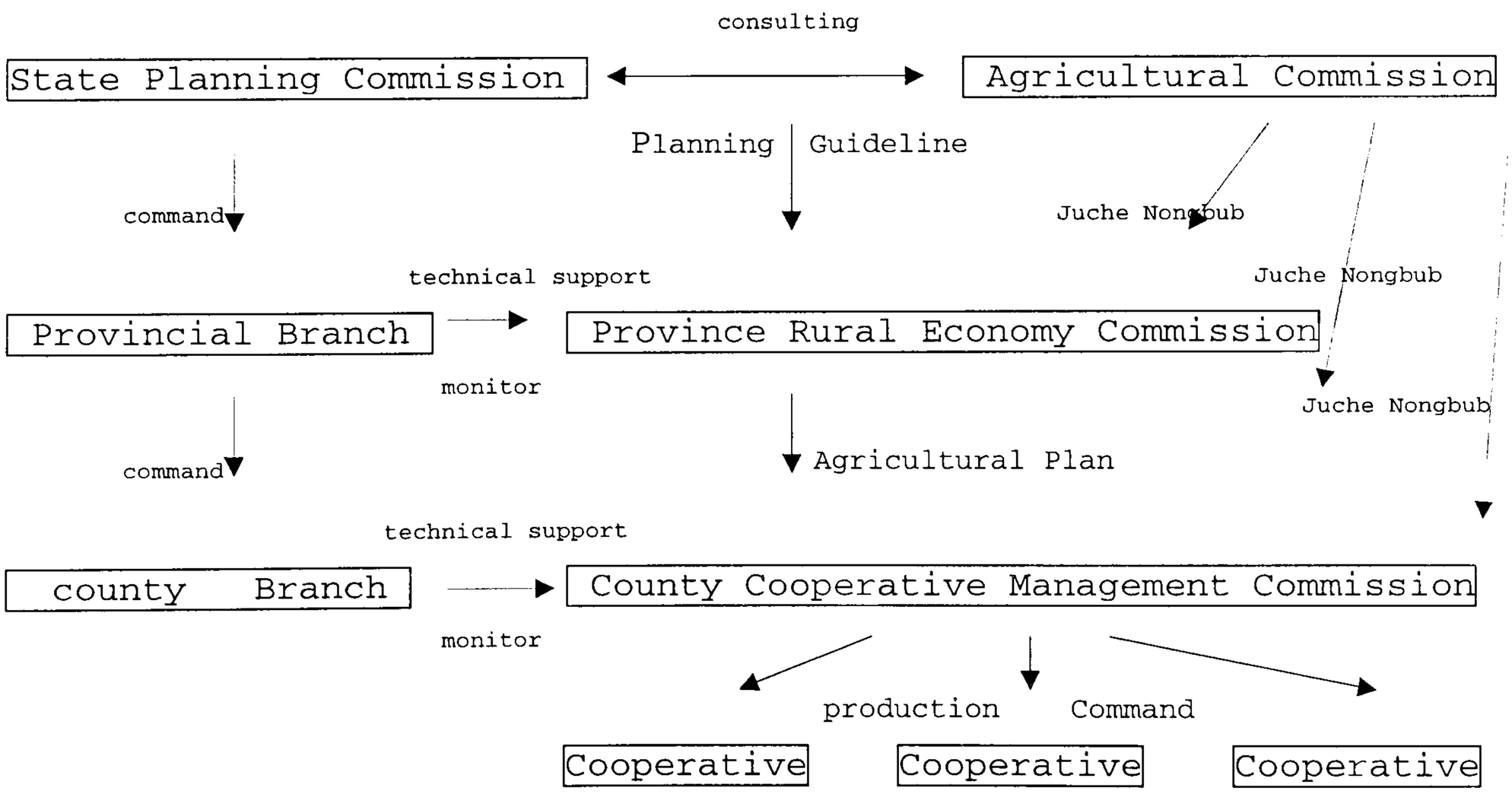
[21] Oh Dae Ho (1989), p. 11-12

process] and defines a mechanical input-output relation for each simple labour process. Moreover, it standardises all agricultural labour processes by lands, crops, seasons and even cooperative farms. In case of ploughing, for instance, it decomposes the process into digging, transferring earth, stockpiling earth and so on, defining a standard output for each activity, say, how deep and how many lines per m^2 for digging. A standard combination of input factors, for instance, how many labourers and tractors per m^2, is also given for each simple labour process with possible substitution ratio between the factors. Finally the exact timing and period of ploughing are specified according to areas, farms, lands, and crops.

The idea of *Juche Nongbub* looks simple. But it has far reaching effects. Above all, it has deprived producers of any powers in farm production: now there is no basic difference between farm labourer and industrial worker. Similarly, local planning and resource allocation processes have gone under the control of the central government. Because all agricultural activities must be now conducted according to *Juche Nongbub*, the central government that finally interprets *Juche Nongbub* could control the activities in any degree.

Figure 2-1. The DPRK Production Institution



[22] For the detailed discussion of *Juche Nongbub,* see section 5.2.2 in chapter 5

The unified and detailed planning in agriculture has developed on the basis of *Juche Nongbub*. It refers to the principle that the centralised planning agencies should plan all detailed farm operations from production to marketing in a nationally unified way. In practice however it means that SPC, the central planning agency, should supervise and monitor local agricultural planning. To do this SPC has established its own branches in provinces and counties, which provide PREC and CCMC with technical supports but at the same time report local plans to SPC and cabinet.

Fig.2-1 illustrates the DPRK agricultural planning institutions. The basic function of the institutions is to set up quantitative output targets and organise corresponding farm operations. In Pyongyang, SPC and Agricultural Commission are responsible for the planning: they make overall planning guidelines that local planning agencies should follow. It is however PREC that has all the planning-related- powers and so actually controls resource allocation. PREC makes real output targets for producers to fulfil, establishes scientific and technological standards in farm operation, and oversees resource allocation. It is the responsibility of CCMC to execute the PREC plan. To do this not only does CCMC own all state resources in county but also have institutional powers to effectively run cooperative farms. Finally cooperative farms carry out actual production according to the operational plans imposed by CCMC.

Although agricultural planning proceeds mainly at local levels, the central government could and does control the process. It is mainly due to the fact that all agricultural practices in the DPRK, from the planning works of PREC to the field works of cooperative farms, are based on *Juche Nongbub* the contents of which is established by Agricultural Commission.

2.3.2. Food Rationing and State Grain Marketing

The corollary of quantitative planning in production is state food rationing in consumption and state grain marketing in distribution. State food rationing covers the whole population, including grain producers, and state grain marketing controls all grain circulation in the economy. Using both institutions the central government plans the country's food consumption up to household level.

State food rationing

State food rationing system consists of two sub-institutions: public distribution system (PDS) and food rationing mechanism in cooperative farms.

All non-farm households are entitled to state food rations provided by PDS. It refers to the administrative hierarchies overseeing public food supply: Procurement and Food Administration Division in People's Service Commission in Pyongyang → its branches in Administration and Economy Committees in provinces and cities/counties → food warehouses in labour districts. Although PDS looks highly centralised, it operates separately by provinces with regionally available food reserves.[23] Each Province Administration and Economy Committee is finally responsible for feeding the population and organises the rationing procedures independently. Nonetheless it is still important to note that the central government sets up the national rationing norms and arranges provincial food trade in order to enforce the norms to all provinces.

Those who are entitled to PDS rations buy their rations biweekly at assigned state shops or food warehouses at official prices. Standard ration quantities are fixed by law and have not changed frequently. But actual rations have varied greatly according to food situation: since 1973, for instance, every household has been officially deducted four days of rations from their monthly rations; and even those reduced rations have not been fully provided in many provinces since the early 1990s.

Unlike non-farm households, farm households are not entitled to PDS rations. Instead, they receive food rations from their cooperative farms.[24] There is a mechanism in cooperative farm to adjust the difference between grain distribution among member households and their food rations. Like PDS, cooperative farms define a standard ration for each farm household: the ration for adult farm labourer usually corresponds to the PDS ration for heavy industrial worker. When a farm household is distributed more grain than the standard ration, the cooperative farm procures and sells the difference to state procurement agencies. In contrast, when the grain distribution is lower than the ration, the farm provides the difference in the form of either grain loan or aid from

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[23] The rationing system has not basically changed since its establishment in 1946, though its recipients gradually expanded to cover the whole population and the standard ration quantities have varied. See section 3.4 of chapter 3 for the basic operation of the system.

[24] See section 4.3.2.2 of chapter 4

communal funds. Just like non-farm households, therefore, farm households have neither more nor less grains than their rations.

Compared with PDS, the rationing mechanism in cooperative farms has two differences. First, it supplies farm households with their annual rations at once shortly after autumn harvest is completed. Second, it operates separately by cooperative farms. Hence, when a cooperative farm does not produce enough grain, it would in principle fail to provide the rations to its member households even while other cooperative farms and PDS still supply assigned rations to their recipients.

State grain marketing

To maintain state food rationing system all grain marketing is carried out exclusively by state procurement agencies.[25] That is, the government plays as the only grain trader in the economy. It is strictly prohibited for any other economic agencies to purchase grain from cooperative farms. In addition, both farm and non-farm households are not allowed to grow grain in their private plots, and all grain markets have been banned since 1958. To unify food procurement and rationing, the administrative hierarchy that runs PDS also controls state procurement agencies.

2.3.3. Central Monopoly of Food Trade

The central government directly controls food trade too. All food trade has been exclusively carried out by state trade agencies under the directives of Foreign Trade Commission in Pyongyang. And it has been prohibited for both local governments and producers to be engaged in foreign trade since the establishment of the communist regime in 1946.[26] The primary purpose of this central monopoly is to keep the balance in foreign food trade.

Given that the country has pursued national food self-sufficiency, it is understandable for the authorities to try to keep the balance in food trade. Indeed, as shown by table 2-3, the country recorded a small amount of surplus in food trade in

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[25] See section 4.3.2.1 of chapter 4

[26] Provisional People's Committee decree No. 93, decree on free grain trade, 4 October 1946

1975-85 even while its overall foreign trade suffered a huge deficit. But a question is: if trade balance is the objective, why is the trade itself necessary?

Table 2-3. The DPRK Grain Trade (total): 1975-1985

	Quantity (1000 MT)	Value (million dollar)
I. Grain Trade		
Import	5076	926
(Rice)	4	14
(Wheat)	4565	853
(other)	507	59
Export	3707	1007
(Rice)	2507	859
(maize)	1200	148
(other)	0	0
Balance	-1369	81
II. Trade - Total		
Import		14031
Export		12444
Balance		-1587

Source) 1. For grain trade, FAO statistical Database
2. For total trade, Choi Su Young (1992), p. 312-313

The answers are twofold. First, since the DPRK agriculture specialises in two main foodgrains of rice and maize, it is necessary to exchange domestic food items with other foreign items so as to diversify the country's food diet. In 1975-85, for instance, the DPRK exported only rice and maize and imported wheat and other minor grains. And this trade pattern has remained unchanged throughout the DPRK history.

Second, the DPRK could increase domestic food supply by foreign trade even while it was maintaining food trade balance. Let us look at table 2-3 again. In 1975-85 the DPRK recorded a surplus in food trade in dollar terms, but it was still a net grain importer of around 124 thousand tons on annual average in physical terms. It means that, on the one hand, the country achieved food self-sufficiency in dollar terms but, on the other hand, increased domestic food supply by physically importing more grain from abroad. The strategy was to exploit international price differences between domestically specialised grain items, mainly expensive rice, and importable foreign items, cheaper wheat. During this period the country imported wheat for the average price of 187 US dollar per MT and other grains for 116 dollar. In return it exported rice for 342 dollar per MT and maize for 123 dollar, respectively. Interestingly the export

price of rice was higher than the import price of wheat, and the export price of maize was higher than the import price of other grains. In contrast, the export price of maize was significantly lower than the import price of wheat. Using this international price structure the country linked the import of wheat with the export of rice, and the import of other grains with the export of maize.[27] Undoubtedly this strategy required a careful plan and control of trade, which was possible under the centrally monopolised trade institutions.

However the importance of this strategy should not be exaggerated. The net import of grain in 1975-85 was only around 2 percent of domestic production. Moreover, as we shall see in chapter 6, this strategy has completely disappeared since the late 1980s as the country's food production began to fall. In this respect it seems fair to say that the primary objective of the DPRK food trade is to diversify the country's food diet while pursuing national food self-sufficiency i.e. keeping trade balance.

2.3.4. Supplement Food Supply Institutions

When the central government controls all food production, distribution, consumption and trade, a risk is that if the government fails to provide appropriate food supply, it would lead to an immediate health crisis of the whole population. To mitigate this risk

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[27] Indeed, as shown below, both the import of wheat and the export of rice continued in 1975-85 while the export of maize stopped soon after the import of other grains ceased. In consequence, the DPRK enjoyed favourable price differences between domestically specialised food items and imported foreign items throughout this period. Using IMF trade statistics, not FAO statistics, Eberstadt (1998) have also reached the same conclusion. He calls this strategy of the DPRK food trade "calorie substitution".

[The DPRK Grain Trade: 1975-85] (1000 MT)

		75	76	77	78	79	80	81	82	83	84	85
Import	total	621	530	500	350	510	510	720	585	350	200	200
	rice					40						
	Wheat	300	430	450	350	470	510	720	585	350	200	200
	other	321	100	50								
Export	total	528	393	570	612	434	227	264	210	120	150	200
	Maize	200	300	300	200	200						
	rice	328	93	270	412	234	227	264	210	120	150	200
Balance		-93	-137	70	262	-76	-283	-456	-375	-230	-50	0

Source) FAO Statistical Database

several institutions are put in place, providing additional opportunities for the population to obtain food. For their purpose we call them 'supplement food supply institutions'. Note however that those institutions apply only to non-grain foodstuffs.

Daean Work System

Daean Work System refers to the collective management principle of the DPRK state enterprise that factory party committee plays the traditional role of manager.[28] An important feature of the System is that it imposes on state enterprises the responsibility to supply all necessary foodstuffs to their employees except grain, creating the position of the second vice chairman who is solely responsible for this task. Due to this System virtually all urban population in the DPRK are engaged in farming activities.

Above all, state enterprises have their own food production facilities. It was already reported in the 1960s that Daean Electric Factory where the System was born had 70 *chungbo* of land for vegetable production, another 80 chungbo for fruit production, a chicken factory with the production capacity of 45,000 eggs per day, and a similar scale of pig factory, feeding about 5,000 employees. In addition, industrial workers are officially allocated farming hours to cultivate either their private plots individually or their factories' lands jointly. They could also freely purchase foodstuffs that cooperative farms supply to their factories under commercial contract.

Independent farm marketing, private plots and farmers' markets

As far as non-grain food items are concerned, both cooperative farms and farm households are given a significant degree of freedom in production and marketing. For these items, after fulfilling state delivery quotas, cooperative farms could sell their products either to state enterprises or to individual consumers in markets. It is also possible for farm households to produce and trade those items privately. They have private plots with maximum of 50 *pyung*, a small number of animals, farm implements

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[28] For an description of Daean Work System in English, see Brun & Hersh (1997), p.351-357

and additional grain for animal fodder under private possession.[29] The products from such private assets are at free disposal of farm households either for their consumption or for markets.

To encourage the production and circulation of non-grain foodstuffs, agricultural markets called 'farmers' markets' are established in almost every city and county, operating either daily, weekly or biweekly.[30] Farmers' markets are run by administrative organisations: City/County Administration and Economy Committee is responsible for providing all necessary resources for the operation of market, including places, communal facilities, security, state shops and so forth. Nonetheless, market prices are determined solely according to supply and demand. The role of administrative organisations is confined to collecting market fees and preventing the circulation of illegal items such as grain and industrial goods.

2.3.5. The DPRK Agricultural Institutions: Summary

The DPRK agricultural institutions are designed to bring food production, distribution, consumption and trade under state control so that the central government could keep the economy from falling into unexpected food shortages.

In production, state agricultural agencies make detailed farm output targets and resource allocation plans, effectively running cooperative farms. Although private production exists, it is under state influences too. For it is up to state agricultural agencies how much, of total resources in agriculture, should be mobilised for cooperative farms and thus how much for private production. In consumption, state food rationing system covers the whole population. There are private food supply channels as well: private production and markets. But their influences are minimal because private food supply is confined to non-grain items. In distribution, all grain marketing is conducted by state procurement agencies. Although farmers' markets exist to circulate private production, their operations are also controlled by administrative organisations. In food trade, the central government monopolises the trade in order to maintain trade balance more effectively.

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[29] Agricultural Cooperative Standard Charter Making Committee, Standard Charter of Agricultural Cooperatives, 24 November 1958 [henceforth Standard Charter of Agricultural Cooperatives, 24 November 1958]

Fig.2-2 summarises the institutions. To show state control of food production, public production function OP is drawn in quadrant A where the government mobilises r out of total resource 1, producing food m. Because r is mobilised for public production, the remaining resource 1-r is utilised for private food production n based on private production function OQ in quadrant B. In this economy the population is not allowed to participate in foreign trade: hence private food production is the only source for the population to obtain additional food other than public food supply. It is shown by the fact that private food supply is depicted also by n in quadrant C.

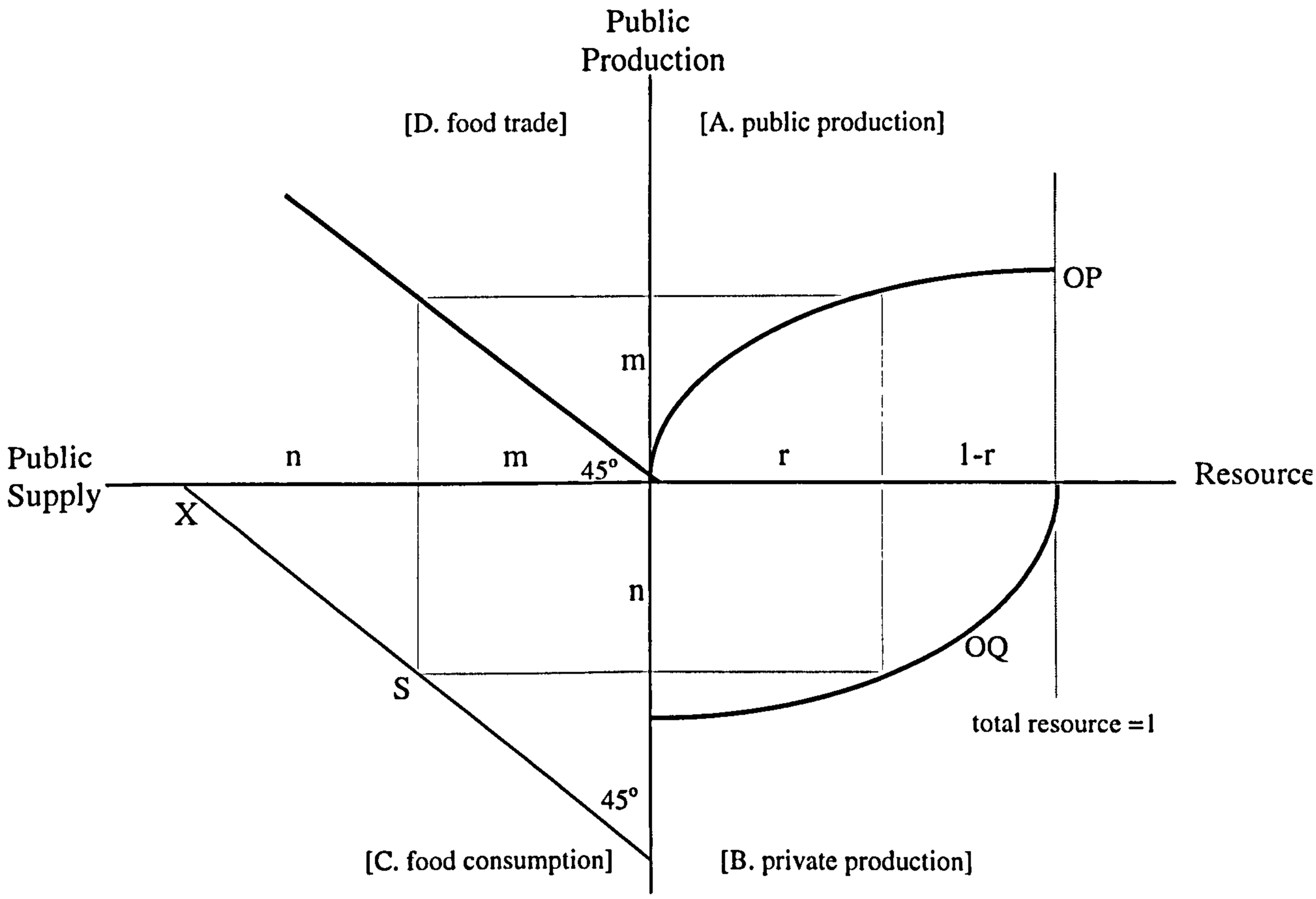

Figure 2-2. DPRK Agricultural Institutions

[30] Kim Chun Sung (1989), p.114-124

There is food trade: the government exchanges public production with other foreign foodstuffs before the production is supplied to the population. But the government pursues the balance in foreign trade, and consequently total public food supply does not differ from public production even after foreign trade. To show this point, a 45 degree line from origin is drawn in quadrant D, transforming public production m into the equal amount of public food supply.

Following these procedures, the total food consumption of the economy is depicted by the point S (m, n) in quadrant C. At point S, however, it is difficult to graphically measure the size of total food consumption. Hence another 45 degree line is drawn through point S to obtain the point X, the distance of which from origin represents the size of total food consumption.

2.4. Food Shortages and Evolution of Agricultural Institutions

So far we have seen that the current agricultural institutions in the DPRK provide a solution to the country's food problem. In this section we put the issue in historical perspectives. That is, we examine how the institutions have evolved in relation to food shortages.[31]

2.4.1. Evolution of Agricultural Institutions

The DPRK agricultural institutions have developed into the current ones through three different stages: 1) private farming in 1945-53; 2) local planning in 1953-73; 3) central planning in 1973-87. And the current institutions have been under the great pressure of change since 1987.

Private farming era: 1945-53

Between 1945 and 1953 agriculture sector consisted of a vast number of private farm households that owned 1.6 *chungbo* of small land on average and carried out

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[31] From now on we do not consider food trade institutions because until very recently they had not changed at all and, as mentioned in section 2.3, food trade had had relatively little importance due to the principle of national food self-sufficiency.

independent farming either for their own consumption or for market. This structure was the result of land reform that redistributed nearly 50 percent of total farmland between March and June 1946.

This stage started with the 1945-46 urban food crisis that highlighted two major issues in agriculture. One was how to establish stable food supply channels for newly established socialist sector. Another was how to break the adverse linkage between scarce resources and low productivity in agriculture. To deal with the issues two centralised administrative organisations were established: Ministry of Food Administration (MFA) and Ministry of Agriculture (MOA) in Pyongyang and their branches in local governments.

It was the responsibility of the MFA hierarchy to provide adequate food supply to socialist sector. This task was carried out through three channels. First, agricultural tax-in-kind was imposed on all crops with a unitary tax rate of 25 percent of harvest. Second, a voluntary procurement principle was established in which Consumer Association traded industrial goods with agricultural products on behalf of the government. Third, on the basis of those two channels, the government provided state food rations to urban socialist workers.

The remaining products after paying agricultural tax-in-kind were freely traded in farmers' markets. The markets were particularly important for those in non-socialist sector that accounted for around 75 percent of total population but were still excluded from state food rationing.

The MOA hierarchy was responsible for increasing agricultural resources and productivity. To do this, it monopolised agricultural resource supply such as fertiliser, water, farm equipment and so forth. And it imposed quantitative production quotas on rural villages/farm households with detailed production guidelines, including sown areas by crops, seed varieties, technologies involved. Unlike those in later stages, the quotas were not compulsory. Nonetheless they were still important because they constituted the basis for the MOA hierarchy to allocate state agricultural resources. To fulfil the quotas it was also encouraged for farm households to form various production teams that seasonally pooled labour, animals and farm implements to conduct joint farming.

New agricultural management system and local planning: 1953-73

Following the Korean War, agriculture was cooperativised between 1953 and 1958. The Korean War ruined economic grounds of private farming system. Nearly 70 percent of farm households fell into the category of poor farmers who could not carry on farming activities without the help of the government. And this ruined agriculture caused a rural food crisis in 1954-55, demonstrating that agriculture was in urgent need of new farming style. In this circumstance agricultural cooperativisation was accomplished successfully without any bloodshed or production failures.

The 1954-55 food crisis and the appearance of collective farming changed the existing agricultural institutions from the bottom.

First, state grain marketing institutions were established. Both private grain production and trade were prohibited, and the grain marketing of cooperative farms was carried out only by state procurement agencies. Farmers' markets continued to exist, but their operation was discouraged and confined to non-grain items that were still allowed to grow privately.

Second, state food rationing expanded to the whole population, including farm households. In addition, as far as non-grain items are concerned, the practices that both farm and non-farm households privately grow food during the Korean War were institutionalised to supplement state food rations.

Third, state agricultural planning started in 1957 and in order to organise the planning process new agricultural management system was established in 1961. The MOA hierarchy was replaced by decentralised administrative organisations in which provincial administrators had all planning-related-powers and responsibilities: Agricultural Commission → PREC → CCMC. The new system imposed quantitative production targets on cooperative farms, making local bureaucrats to effectively run cooperative farms.

Juche Nongbub and central planning: 1973-87

From 1973 to the mid 1980s agricultural planning was highly centralised. Both *Juche Nongbub* and the principle of the unified and detailed planning were added to new

agricultural management system so that the central government intensified its control over local administrators and producers.

Between 1970 and 1973 another food shortages hit the DPRK due to grain production failures. During this period agricultural input supply plummeted, weather was bad, and agricultural resources were transferred to industry and military sectors. Yet the DPRK leaders believed that the main reason for the production failures was the inefficiency of local bureaucrats in charge of agricultural planning, which led to the personal intervention of Kim Il Sung in agriculture. From 1973 he began to emphasise new farming practices, which were later aggregated as *Juche Nongbub*. Since then *Juche Nongbub* has appeared as the only farming practice in the country. In order to realise *Juche Nongbub* in agricultural planning and resource allocation, Agricultural Commission established Staff Department in 1979, beginning to directly control local planning processes as well as actual farming activities in cooperative farms.

Agricultural planning went under the influence of SPC as well. In 1978 the unified and detailed planning was introduced in agriculture, giving local SPC branches the power and responsibility to supervise the operation of state agricultural agencies and monitor their planning processes.

The era of institutional crisis or confusions: from 1987 to present

Through the above three stages, four basic agricultural institutions –quantitative planning in production, food rationing in consumption, state grain marketing in distribution and supplementary food supply channels- have had the current forms. But these current institutions have been under great stress since 1987.

The period from 1987 to present is characterised by the ongoing food shortages that eventually led to the great food crisis in the mid/late 1990s. To overcome the shortages the authorities took various emergency measures that are quite contradictory to the existing institutions. In production, many cooperative farms have been allowed to own farm machinery and necessary facilities, freely choose their production items and organise production procedures independently. In consumption, the roles of state food rationing have been played down and, instead, private grain production has been tolerated and even encouraged. In distribution, state grain

marketing has largely collapsed as farm households have been allowed to keep a part of their surplus grains and trade them in farmers' markets. Concerning supplementary food supply channels, the existence and even expansion of illegal private plots have been tolerated and all the regulations on farmers' markets have been effectively lifted.

Undoubtedly those measures have weakened the current institutions in which the central government is supposed to control all economic activities concerning food. Along with the measures, however, the authorities have taken other contradictory measures to reinforce the existing institutions. For instance, a centralised ministerial system (the MOA hierarchy) re-emerged in 1998, strengthening central control over agriculture. Another *Juche Nongbub* campaign, which is quite similar to that in the 1970s which intensified central intervention in agriculture, has been launched. Illegal private plots and grain trade in farmers markets have been greatly discouraged whenever food situation improved. And the authorities have made repeated efforts to revitalise state food rationing, in spite of its diminished roles.

It seems therefore risky to make any robust conclusion about the institutional changes in this period. Nonetheless it is certain that the current agricultural institutions have faced the need of great changes due to the ongoing food shortages since 1987.

2.4.2. State Control and Resource Supply in the Evolution of Agricultural Institutions

From the above discussion it seems evident that the evolution of agricultural institutions in the DPRK has been largely motivated by repeated food shortages. A question is: how successful was this evolution? Of course, all historical institutional stages have failed to prevent food shortages: hence so far the institutional evolution has not seemed so successful. But how did each institutional change affect foodgrain production?

Table 2-4. Agricultural Institution, Grain Production and Resource Supply by Stage

	1946-1953	1953-1973	1973-1987	Since 1987
Agricultural Institutions	private farming	collective farming, local control, private production and market discouraged	collective farming, central control, private production and market discouraged	collective farming, decentralisation, private production and market encouraged
Grain Production (annual average growth rate, %)				
Official claim	2.9	4.2	4.6	-12.3
FAO estimate	-	-	3.3	-9.2
Fertiliser Supply (annual average, 1000MT)	n.a	232	671	534

Source: 1) For the growth rates of grain production, table 6-3 and 4 in chapter 6

2) For the average fertiliser supply, FAO statistical database.

Table 2-4 presents annual average growth rate of grain production by four different institutional stages. Interestingly, the rate had steadily increased as agricultural institutions had changed so as to intensify state control over agriculture by the late 80s. More interestingly, the rate has fallen dramatically since the institutions reportedly began to be liberalised and decentralised in 1987. It means that the DPRK agricultural institutions were more successful when they were more centralised and administrative.

It is well known that state control frequently undermined agricultural performance in many socialist countries. In the Soviet Union, for instance, the Stalin era during which agriculture was planned by a centralised administrative hierarchy was most vulnerable to famine.[32] China also suffered low agricultural productivity during the Commune era when bureaucrats directly controlled farm operations.[33] Why has it been not the case in the DPRK?

A possible explanation is that in the DPRK the degree of state intervention has been proportionate to the level of state resource supply in agriculture. Initially the

[32] During the Stalin era, for instance, the Soviet Union experienced three or four famines (Ellmann: 1999) while there has been no reported famine since Khrushchev's agricultural reform

[33] See Lin(1990)'s assessment on China's agricultural productivity by periods.

DPRK agriculture started with extremely poor resources leading to low productivity, and even few available resources were scattered among a vast number of poor farm households. Hence the only way to increase agricultural production was to increase state resource supply to farm households. The situation worsened as most farm households were deprived of their private assets during the Korean War. Hence agriculture was cooperativised to intensify state resource supply by increasing state investment in agriculture and transferring private resources to state resources. This trend continued in the 1970s and 1980s when Juche Nongbub intensified state control over agriculture and at the same time made agriculture more dependent on non-labour inputs exclusively provided by the government. As the result, the level of state intervention and the degree of state resource supply in agriculture had tended to increase simultaneously by the late 80s. Since then, however, the situation has fundamentally changed. Due to ongoing industrial stagnation the state can not afford to increase its resource supply in agriculture. According to FAO statistics, for instance, fertiliser supply that has been monopolised by the government since 1946 had rapidly increased by the late 80s but suddenly fell since. In this circumstance the authorities have decentralised and liberalised agriculture, encouraging private production.

If there is a positive relation between state resource supply in agriculture and farm outputs and if state intervention is made to increase the resource supply, it would not be so surprising even if intensified state control helps to increase farm outputs. This is the basic reason why more centralised and administrative institutions have had more successful results in the DPRK agriculture.

2.4.3. Food Shortages and the Evolution of Agricultural Institutions

The above discussion provides a hint to understand basic relation between food shortages and the evolution of agricultural institutions in the DPRK. As mentioned briefly earlier, all food shortages in the DPRK happened from sudden resource contraction in agriculture, more correctly, external shocks adversely affecting resource availability in agriculture. In order to overcome the shortages, however, the authorities in some cases intensified state control over agriculture and in other cases liberalised it.

Why? We believe that the reason is the feasibility of state/private resource supply in agriculture.

Consider the 1945-46 food crisis. After the Japanese rule private resources in agriculture were extremely limited. This was in part because most farm households were too poor even to feed themselves properly, in part because the 1946 land reform act, as shall be discussed in chapter 3, prohibited private land trade, effectively preventing private investment in agriculture. The only option to overcome the food crisis was therefore to increase state resource supply in agriculture. Indeed the government either nationalised or monopolised all important agricultural resources, established official resource allocation channels in agriculture, and organised farm operations in more collective ways that farm households pooled their labour, animals and farm equipment in order to mobilise existing resources more efficiently. As the result, although private farming system remained unchanged, state intervention in agriculture was already paramount in the mid/late 1940s.

How about the 1953-54 food crisis? During the Korean War most farm households were further impoverished and the still remaining small-scale private sector in industry was almost completely ruined. In this regard, private investment was not a feasible option to overcome the crisis again. To resolve this difficulty, on the one hand, the government intensified cooperativisation drive in agriculture. On the other hand, it launched a series of local industrialisation programs that local government established local factories and provided agricultural inputs to newly emerging cooperative farms. Due to both policies the government appeared as the only economic agent to run agriculture. Indeed private grain production was prohibited and all the production of cooperative farms was marketed by state procurement agencies. Farmers' markets were either closed or heavily regulated, and even farm households' food consumption was controlled by state food rationing system.

The 1970-73 food shortages provide a similar case. Due to ongoing heavy regulations on private production in agriculture there were no significant resources left in private hands. Meanwhile, agricultural production was becoming more intensive and thus more dependent on such inputs as farm machinery, chemicals and fertilisers supplied by large state industries under the control of the central government. In this circumstance the government focused on increasing industrial investment in agriculture in order to overcome the food shortages. However, as the investment increased, the

central control over local agricultural administrators and cooperative farms intensified accordingly. Indeed the central government introduced *Juche Nongbub* and announced the unified and specified agricultural planning, controlling all the activities of local administrators and cooperative farms.

The food crisis in the 1990s however occurred in quite opposite circumstances. Between the late 1980s and the mid 1990s the country experienced a series of economic shocks undermining state resource supply in agriculture. The breakdown of the USSR led to immediate shortages of fuel, machinery and advanced technologies, which resulted in a drastic decline in industrial outputs. For three consecutive years from 1993 to 1996, for instance, industrial production declined by 30 percent every year. It was therefore not feasible for the government to increase industrial investment in agriculture to overcome the food crisis. In addition, there were successive natural calamities such as the great flood of 1995 that damaged almost 60 percent of arable land. Hence, it was also difficult to mobilise even existing state resources in agriculture.

Reflecting these circumstances, state response to the crisis was quite different from those to previous food shortages. Above all, the government played down its roles in agriculture. The management of cooperative farm was liberalised and, at the same time, decision-making processes within agricultural administrative hierarchies were also decentralised. State food rations were drastically with increasing emphasis on food self-sufficiency at enterprise and household level. On the other hand, the government encouraged private resource mobilisation for food production. Private grain production was tolerated and even urban population was given private plots for foodgrain production. In addition, all existing regulations on farmers' markets were effectively lifted so that people could freely trade all agricultural products, including foodgrain. In consequence, private farming and profit-pursuing activities in agriculture flourished for the first time since it was cooperativised in the late 1950s.

To sum, all the food shortages in the DPRK have commonly occurred from sudden resource contraction in agriculture, but their impacts on agricultural institutions varied, depending on the feasibility of state/private resource supply. When food shortage occurred in a situation that private resource mobilisation was not feasible, it led to intensified state intervention in agriculture aiming to increase state resource supply. Agricultural institutions had evolved in this way by the early/mid 1980s. Conversely, when there was little chance to increase state resource supply, food

shortage weakened state intervention while encouraging private resource mobilisation in agriculture. It is the reason why the DPRK agriculture was reportedly liberalised and decentralised during the food crisis in the 1990s.

2.6. Conclusion

The discussion of this chapter could be summarised as the following four findings.

1. The DPRK has developed its agriculture in a way to make food production more vulnerable to external shocks. As the result, the country has faced periodic food shortages even for the period that the production had a clear increasing trend. This vulnerability constitutes the DPRK food problem.

2. All the agricultural institutions in the DPRK are designed to solve the country's food problem. The idea is that the government should control all economic activities concerning food in order to keep national food self-sufficiency and prevent food shortages at the same time. To realise this idea four major institutions have been put in place: quantitative planning of farm outputs, state food rationing, state grain marketing, central monopoly of food trade and some supplement food supply institutions.

3. In historical perspectives the DPRK agricultural institutions have evolved in order to increase resource availability in agriculture. It closely related to the fact that all the food shortages in the DPRK have happened from sudden resource contraction in agriculture. To increase the resource availability the authorities have intensified state control over agriculture when they were capable of increasing state resource supply but conversely, when such resource supply was not feasible, they liberalised agriculture and encouraged private resource mobilisation.

4. The DPRK agricultural institutions have developed through four stages: private farming in 1946-53, local planning in 1953-73, central planning in 1973-87 and the era of change since 1987. For the first three stages, increasing state intervention

dominated institutional development. In contrast, the last stage saw various signs of institutional liberalisation and decentralisation.

On the basis of these findings, the next three chapters examine the country's first three institutional development stages in detail. The final stage will be discussed in chapter 9 as an effort to understand the implications of the recent food crisis on the future of the DPRK agriculture.

III. Land Reform, the 1945-6 Food Crisis and the Early Agricultural Institutions: 1946-1953

3.1. Introduction

This chapter examines the development of the DPRK agricultural institutions from the country's independence in 1945 to the eve of agricultural collectivisation in 1953.

This period was unique in the DPRK history in which state control has been paramount both in agricultural production and marketing. Although the authorities influenced farm outputs through state resource allocations, all the basic farming decisions were still made by individual farm households who were the owners of their land. In addition, as the authorities restrained coercive measures in farm marketing, a large amount of rural surplus was freely circulated in increasing number of markets. Hence the agricultural institutions of this period were completely different from the current ones.

Nonetheless, this period was of great importance in two respects. First, the agricultural institutions of this period were formed to resolve the country's ongoing food pressures and agricultural resource shortages. These two purposes of the institutions have not changed until this time. Second, it was the only period that private farming dominated agriculture in the DPRK history. Assuming that the current DPRK agriculture is changing into private farming, this period have many implications for its future.

This chapter is organised as follows. Section 3.2 studies the farming style of this period in which numerous small-scale owner farm households carried out independent farming. It provides the background knowledge for the agricultural institutions of this period. And section 3.3 examines the evolution of agricultural marketing institutions in relation to the 1945-46 food crisis. In section 3.4 we consider why state food rationing was introduced and how it worked. Section 3.5 studies another main issue of this chapter, the relation between agricultural planning institutions and agricultural resource shortage. Finally section 3.6 summarises the discussion of this chapter.

3.2. Land Reform and Small-scale Owner Farming System

Between 1946 and 1953 the DPRK agricultural institutions were based on small-scale owner farming system in which each farm household owned 1.6 *chungbo* of land on average, which was not tradable, and carried out independent farming. This farming system was the result of the 1946 land reform that influenced 54 percent of total arable land and 68 percent of total farm households.

3.2.1. Land problem

At the end of the Japanese rule the DPRK was primarily an agrarian society. Agriculture employed nearly 70 percent of total population and produced around two-thirds of national outputs.[34] But this agriculture was in need of immediate reform due to a great inequality in land ownership that produced the land tenancy with extremely high farm rents prevailing in rural area.

During the Japanese rule there had been a gradual, but persistent, shift in the nature of land ownership that turned owner-farmers into tenants and farm labourers. In Korea as a whole, the share of owner farmers declined to 17.8 percent of total farm households in 1941 from 21.7 percent in 1941 while that of tenant farmers increased from 35.9 percent to 53.6 percent. The northern part of Korea was not an exception. In 1942, for instance, 46 percent of North Korean farm households were categorised as pure tenants and another 22 percent as owner-tenants i.e. part owners and part tenants, showing that land tenancy was the dominant farming style in North Korea. This land tenancy was the result of increasing inequality in land ownership. Indeed more than 58 percent of total arable land was owned by a small number of landlords who made up only 4 percent of total farm households in 1945. By contrast, a majority of peasants comprising for 57 percent of total farm households owned just 4 percent of total arable land.[35]

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[34] Chung (1974), p.121
[35] *Chosun Jonsa,* Vol. 24, p. 130

This lopsided distribution of land, coupled with scarcity of arable land and growing population, had brought extremely high farm rents. Under the Japanese rule farm rents averaged from 50 percent to 60 percent of harvest, often mounting up to 70 percent.[36] In addition, tenant farmers were solely responsible for 58 kinds of land taxes, compulsory state grain collection and mandatory hard labour.

Not surprisingly this land tenancy with high farm rents had caused much unrest in rural area. Many poor farm households who were deprived of their land were forced either to migrate to Manchuria or to join frequent farm strikes against landlords. In particular, though discouraged by the colonial government, the tenancy disputes had drastically increased since the early 1930s as the number of tenant farmers began to sharply rise. In 1937, for instance, the number of reported tenancy disputes reached 1,527 in South Pyongan, 1,575 in North Pyongan and 1,378 in Hwanghae; and other provinces also had more than a thousand disputes.[37] The Korean communist movement under the Japanese rule greatly inspired these tenancy disputes, and particularly the communist-led peasant union movement had a fairly strong following in the northern part of Korea. In this reason, when the communists took over the country in 1945, they immediately pledged a through land reform in agriculture.

Table 3-1. Farm Households by land ownership pattern: 1942

	Owner farmer	Owner- tenant	Tenants	Fire-filed farmer	Farm labourer	Total
Households	264,220	222,629	459,613	46,590	14,419	1,007,451
Ratio (%)	26.2	22.1	45.7	4.6	1.4	100

Source: Kim Sung Bo (1997), p. 35

3.2.2. The 1946 Land Reform

The pressures for land reform were paramount particularly when Provisional People's Committee (PPC), the first central government in the DPRK, was formed on 26

[36] Lee, Chongsik (1963), p.66

February 1946. Province people's committees that had exercised the country's sovereignty before PPC had already begun to confiscate the land owned by Japanese and Korean national traitors. And numerous local communist groups had initiated a series of mass peasant movements, calling for immediate land reform. To consolidate and control such pressures PPC announced Land Reform Act (LRA) on 6 March 1946, launching a centrally organised land reform program.

LRA stipulated that the reform has three purposes: 1) cleansing out colonial factors in rural economy; 2) abolishing tenancy system; 3) eliminating landlords as a class.[38] On this basis it proclaimed the direction of the reform as follows. First, all the land owned by Japanese, Korean national traitors and those who co-operated with the Japanese imperialists should be confiscated without compensation and nationalised (article 2). Second, all the land owned by Korean landlords who had more than 5 *chungbo* should be confiscated without compensation and redistributed free of charge to farm households with no or little land (article 3). Farm households should have the ownership of the redistributed land, but it should not be allowed to trade the land in any reason. Third, all the other properties of the landlords whose land was confiscated, including animals, farm equipment, houses, land belonging to houses, should be confiscated without compensation, being redistributed (article 11). Fourth, all existing debts of tenant farmers and farm labourers to landlords should be cancelled (article 9).

To implement those reform programs 'land reform committee' was established from Pyongyang to every county in the country. In village 'rural committee' was formed, being in charge of the reform. Land reform committee consisted of the bureaucrats sent by local people's committees and the delegates of the North Korean Peasant Federation, the communist-led national peasant organisation. But the committee's role in the reform was limited. It did not take part in the process of land confiscation and redistribution. Instead it helped organise rural committees, propagandised LRA, maintained social order, provided administrative staff to rural committees, and gave official approval when the reform was completed.

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[37] Kim Sung Bo (1997)
[38] Land Reform Act, in Minjok Tongil Chulpansa, *Bukhan Gyungje Jaryojip* [Collected materials of the DPRK Economy], 1996, p. 14-15

In this sense it was rural committee that set up the concrete rules of land reform and actually confiscated and redistributed land.[39] A rural committee consisted of 5-9 members who were elected in village conference led by village peasant federation. And it had six brigades for the execution of the reform: land survey, propaganda, activist, self-defence, communication, and security brigade. In principle a committee was formed in a village, but it often represented a number of villages or only a fraction of village according village size. During the reform there were more than 11,500 rural committees that had 90,697 members across the country.[40]

Land confiscation and redistribution were completed in a month with fast speed but through number of gradual steps. Above all, rural committees conducted village land surveys in order to locate land by households and determine land bands according to fertility. Village household surveys also followed to establish the number of village members who were entitled to land redistribution. On the basis of those two surveys, rural committees decided the extents and contents of properties that were subject to confiscation and redistribution. All the properties to be confiscated, including land and other properties possessed by landlords, were forced to be registered to rural committees with the formal statements of owners that they would neither sell nor damage the properties until the redistribution was completed.

The redistribution of land was determined by three factors: 1) the number of family members; 2) the priority of existing tenant farmers; 3) previous living conditions. In village each household was given its household points according to the number, sex, and age of family members by a point assigning system as shown by table 3-2. And each rural committee calculated total village points collected by all entitled households in its village. The size of land redistribution to each household was determined by the share of its household points in total village points with the limit of 5 *chungbo* at maximum. Once the size was determined, the committee considered other two factors in order to decide 'which land to whom'. If the household was a tenant, it was distributed the land it previously cultivated under the tenancy. If the household was not a tenant or if its tenanted land was smaller than the

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[39] The Korean Workers' Party Publisher, *Kim Il Sung Jojakjip [Collected Works]*, Vol.5, p.341 [henceforth *Kim Il Sung Jojakjip*]
[40] *Chosun Jonsa*, Vol.24, pp.154-155

assigned size of redistributed land, other land was given to the household according to its previous living condition: more fertile land to poorer household.

Table 3-2. Land Point By Sex and Age

	Sex	Age	Points
Adult	Male	18-60	1
	Female	18-50	1
Youth	Male and female	15-17	0.7
Child	Male and female	10-14	0.4
Child	Male and female	Below 9	0.1
Aged	male	Over 61	0.3
	female	Over 51	0.3

Source: Minjok Tongil Chulpansa, *Bukhan Gyungje Jaryojip [Collected Material for North Korean Economy]*, 1996. P.264

After the above steps were taken, rural committees proceeded into actual confiscation and redistribution. The procedure was quite simple but effective. Each rural committee held 'village land reform conference' where the chairman of the committee read LRA, declared the list of confiscated land and properties, and disclosed its decision of redistribution by households. Animals, farm equipment and other properties were physically confiscated and redistributed in the conference. And the land was registered to village land books in the names of new owners, which were then submitted to local people's committees for approval. The procedure effectively ended at the end of March 1946, but formally ended between 22 May and 20 June 1946 when province people's committees issued the statements of land ownership to new owners.

3.2.3. The Establishment of Small-Scale Owner Farming system

The scope of land reform is presented by table 3-3. During the reform 1,000,325 *chungbo* of land, which amounted to 53.8 percent of total arable land, was confiscated and, of the confiscated land, 981,390 *chungbo* was redistributed. The landlords whose

land was confiscated accounted for 26.5 percent of total farm households while 41 percent, 740,616 households with no or little land, benefited from the redistribution. Apart from the land, 4,774 cows and horses, 14,477 buildings and houses, all seed grains, farm equipment, fertilisers possessed by landlords were also confiscated and redistributed.

Table 3-3-A. The Scope of land reform: land confiscation

	Area		Households	
	Chungbo	ratio (%)	*chungbo*	ratio (%)
Land owned by Japanese	112,623	11.3	12,919	3.1
Land owned by traitors etc.	13,272,	1.3	1,366	0.8
Land owned by landlords with more than 5 *chungbo*	237,736	23.8	29,683	7.0
Land owned by those who rent all their land	263,436	26.3	145,688	34.5
Land owned by those continuously rent the land	358,053	35.8	288,866	54.1
Land owned by temples, churches, religious organisations	15,195	1.5	4,124	1.0
Total	1,000,325	100	482,646	100

3-3-B. The Scope of land reform: land redistribution

	Area		Households	
	Chungbo	ratio (%)	*chungbo*	ratio (%)
To farm labourers	22,387	2.3	17,137	2.4
To peasants without land	603,407	61.5	442,978	61.1
To peasants with little land	345,974	35.3	280,501	38.0
To relocated landlords	9,622	1.0	3,911	0.5
Land held by people's committees	18,935	1.9	-	-
Total	981,390	100	744,527	100

Source: DPRK Central Bureau of Statistics (1961)

Table 3-4. Farm Households by the land holding size after land reform: 1946

(*Chungbo*)

	0-0.5	0.5-1	1-1.5	1.5-2.5	2.5-3.5	3.5-5	above 5	Total
Number	120381	229212	257669	235248	208206	59743	10782	1121295
ratio(%)	10.7	20.4	23.0	21.0	18.6	5.3	1.0	100

Source: Research Institute for Asian Culture, *Bukhan Gyungje Tonggye Jaryojip* [Collected Materials for North Korean Economic Statistics], 1994, p.34

The reform brought basic changes in rural land distribution. Before and after the reform the share of farm households with more than 5 *Chungbo* of land declined from 6.8 percent of total farm households to mere 1 percent, and those with less than 1 *Chungbo* also fell from 55.7 percent to 31.1 percent. In contrast, the share of farm households with 1-5 *Chungbo* rose up to 67.9 percent from 37.5 percent.[41] In terms of land holding size, therefore, most 'poor' and 'rich' farm households turned into 'middle' ones.

The most important result of the reform was however that it established small-scale owner farming system. Due to the land reform former tenants, owner-tenants, farm labourers and even a part of landlords were all transformed into owner-farmers, and consequently owner-farmers appeared as the only form of farm households in rural economy. Newly emerging owner-farmers had relatively small land, 1.63 *chungbo* on average, but they were free from all existing debts and landlords' intervention in their land. Like private farm households in market economy, therefore, they could organise all farming activities independently under their own decisions and risks. In this sense the DPRK agriculture in 1946-53 was primarily a private farming system. But this system did have two basic constraints that do not exist in market economy.

First, farm households could not invest in land and so their farming scale could not exceed the boundary of their family labour force. LRA prohibited the redistributed land from any kind of trade. The land that had not been subject to the

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[41] Kim Han Ju (1960), p.40.

redistribution was in principle tradable. But the trade also must win the approval of province people's committee that did not give the approval unless the buyers proved that they were able to cultivate additional land with their own family labour force. In consequence, the small scale of family farming remained as the most underlying feature of agriculture until it was collectivised in the 1950s.

Second, farm households were under some degree of administrative control in both production and marketing. Immediately after the land reform, as discussed later, the authorities began to impose output targets on farm households. Though not compulsory, the targets affected farm households for two reasons: 1) due to the land reform and subsequent nationalisation of industry government appeared as the sole supplier of agricultural inputs such irrigation, fertiliser, farm equipment etc; 2) the output targets imposed by the authorities constituted the basis on which the government allocated its agricultural resources. And farm households had to fulfil state grain demands as well as faced various regulations on grain market.

3.3. The 1945-46 Food Crisis and Agricultural Marketing Institutions

When the new socialist government was formed in 1946, the country faced a serious urban food shortage. The initial response of the government was to launch a compulsory grain collection campaign in rural areas. However, as small-scale owner farming system was established, this compulsory campaign was replaced with more permanent and stable food collection channels. In his section we consider how and why these channels came into being.

3.3.1. The 1945-46 urban food crisis

Although the DPRK was an agrarian society, it had faced chronic food shortages under the Japanese rule, particularly in rural areas. According to the official DPRK statistics 77 percent of total farm households faced the depletion of food before harvest in 1940 and 47 percent was in the constant borrowing of food.[42] Indeed

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[42] *Chosun Jonsa,* Vol.24, p.129

it was common in most rural areas that people gathered wild foods and grass roots to survive annually repeated lean season.[43] These chronic food shortages however turned into a real food crisis in 1945 when the country became independent.

The year of 1945 saw a disastrous decline in grain production. Compared to the normal level, the production fell by 50 percent in North Hamgyung, 40 percent in South Hamgyung, 30 percent in South Pyongan, and 10 percent in Kangwon.[44] The reason for this decline is not clear. It might be due to bad weather or the social and economic confusion after the end of Japanese rule or other factors. What is certain however is that this decline in grain production caused a severe food shortage across the country in the winter of 1945-46 when the socialist government was first formed.

> After the liberation the population of North Korea was about 9,257,000 (at the beginning of 1946) while the grain production of 1945 was only around 11,100 thousand *sok*. In North Hamgyung the estimated population was 115,8000 and the normal production level was 1,031,132 *sok*....Hence, even with the normal production the amount of food shortage reached 438,213 *sok*. Furthermore, because the production of 1945 dropped by 50 percent, the food situation was more serious.[45]

Interestingly the shortage hit urban areas first. At the end of the Japanese rule state grain reserves were almost empty. The colonial government had sent out most state reserves to the front army while food supply from rural areas almost stopped due to the collapse of the colonial collection system and the production fall in 1945. By

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[43] Food availability had persistently fallen during the Japanese era. In Korea as a whole, per capita annual food consumption declined from 2.03 *sok* in the late 1910s to 1.52 *sok* in the early 1940s. The decline was mainly due to coercive grain exports to Japan that had dramatically increased since 1930 when the Japanese government transformed Korea into a main food supplier for the Japanese army during the Second World War. In consequence, food shortages were chronic across the country between the early 1930s and the early 1940s, particularly in rural areas where farm households had faced 'wartime grain collection [*junsi gongchul*]' (Kim Seung Jun, 1988, p. 74-77).

<The Food Availability Under the Japanese Era>

(unit: *sok*)

(average)	Production	Net Export	Total Consumption	Per Capita Consumption
1915-19	36,733,369	3,080,187	33,870,677	2.03
1920-24	38,842,608	3,777,452	34,724,097	1.98
1925-29	38,221,485	2,635,199	34,404,344	1.81
1930-36	41,700,841	8,858,905	33,958,148	1.64
1937-42	43,583,199	5,190,832	35,067,073	1.52

Source: *Chosun Eunhaeng*, *Chosun Gyungje Yonbo* [Economic Yearbook of Korea], various years.

[44] *Chosun Jonsa*, Vol.23, p. 400

[45] *Pyongbuk Shinbo* (Pyongbuk Newspaper), 13 Feb 1946, quoted in *Chosun Jonsa*, Vol.23, p.400

contrast, state food requirement increased sharply. Shortly after the country's independence the new socialist government nationalised major industries[46] and supplied food rations to their employees who comprised around 20 percent of total population in 1946. Moreover, the government should meet the food requirement of the Soviet military forces in the country, which accounted for more than 6 percent of total grain production in 1946.[47] Those who were returning from Manchuria and Eastern Russia also added up the pressure. Most of them returned to urban areas and many of them have priorities in state rations due to their career of anti-Japanese struggle.

Facing the collapse of government food balance, the authorities prohibited private grain trade in urban areas and procured all the grain possessed by grain merchants in October 1945. In return, they supplied food rations to all urban dwellers. But the rations were minimal: daily standard ration for adult was 500 grams, which was the lowest in the DPRK history except in the 1990s. And those minimal rations were not supplied fully.

To resolve this urban food shortage the authorities launched a harsh grain collection campaign [*yanggok sungchul undong*] in the winter of 1945-46. Even before the central government was formed, province people's committees had imposed compulsory grain delivery quotas on all farm households. The quotas were made in a simple way. Farm households were allowed to keep minimal foodgrain, 500 grams per person per day, for their own consumption. In return, they should sell all the remaining grain to state.[48] Peasant conference was held in every village, surveying farm households' grain reserves and allocating state delivery quotas. Not only private grain trade was prohibited in rural areas but also even using grain without permission for other purposes such as animal fodder was not tolerated.

And this local collection campaign was endorsed as an official state policy on 27 February 1946 when PPC adopted the decree of emergency food policies:

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[46] It was in August 1946 when the authorities officially announced the nationalisation of major industries. From August 1945, however, local people's committees already began to take over the industries and firms owned by the Japanese government, people and organisations and de facto nationalised them.

[47] According to Kim Sung Bo (2000: p. 244) the Soviet military forces in the DPRK demanded 111,283 tons of foodgrain in 1946. It was around 6.3 percent of total grain production in that year. Though it is not clear how much grain was actually delivered to the Soviet army, it seems obvious that the Soviet food requirement was a huge burden to the DPRK authorities.

[48] *Chosun Jonsa*, Vol.23, pp.403-404

> Article 6. Landlords and peasants deliver the unfulfilled quotas by the 30th of March according to their quotas already announced. Pay the appropriate prices for the grains that landlords and peasants submitted. If landlords and peasants do not accomplish the submission by the above period and their surplus grains are found, the grains will be confiscated.[49]

According to this decree 'emergency food committee' was established from Pyongyang to all counties, being in charge of the collection, delivery and custody of grain. In village actual actions were taken by 'collection team' in which the members of peasant federation, labour union and other social organisations participated. Its role was to search and confiscate all the remaining grain in village.

The campaign was completed in a very short space of time before the 1946 spring planting, but in an extremely harsh manner. Those who did not co-operate with grain deliveries were immediately handed over to local security authorities for imprisonment. And any hidden grains, when caught, were confiscated without charge. In many cases the authorities set delivery targets so high that farm households could not keep the minimal grain they were allowed to do.[50]

This coercive campaign might help the new socialist government overcome the country's food crisis in 1945-46. But it could not be a permanent institution for several reasons. First, it could damage the incentives of newly emerging owner farm households, possibly leading to another disastrous decline in grain production. Second, it could be also politically risky. Coercive grain collection could focus on the small number of landlords before the land reform. Under small-scale owner farming system, however, numerous poor farm households had to deliver their grain to state. Given that the new socialist government was still in its early stage to need the support of poor farm households, the ongoing compulsory collection might cause political problems. Third, the government frequently emphasised that the compulsory grain collection would be temporary until the new socialist state was firmly in place. This emphasis was made because farm households had already suffered immensely from

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[49] PPC decree no. 2, Provisional People's Committee decision on food policy, 27 February 1946.
[50] Even the official DPRK history textbook wrote that the farm households who faced food shortages after fulfilling delivery quotas in North and South Hamgyung had to gather wild foods in mountains and fields, and that there were farm households complaining about the bureaucrats who did not pay appropriate prices for grain delivery (*Chosun Jonsa*, Vol.23, pp.403-404).

the similar coercive collections by the Japanese government.[51] It was therefore difficult to launch another coercive campaign after PPC was formed in February 1946 and the Democratic People's Republic of Korea was officially established in January 1947.

3.3.2. The formation of new agricultural marketing institutions

Between April and October 1946 the authorities introduced a series of new agricultural marketing institutions to replace compulsory delivery quotas. The institutions consisted of three parts: agricultural tax-in-kind, the voluntary grain procurement of consumer association, and (farmers') markets. On the one hand, the institutions aimed to establish stable food supply channels for urban socialist sector. Both agricultural tax-in-kind and the voluntary procurement served this purpose. On the other hand, the institutions intended to leave a significant amount of agricultural surplus in the hands of farm households, promoting their production incentives. Farmers' markets served to circulate this surplus remaining in farm households.

3.3.2.1. Agricultural Tax-in-kind

A new grain-marketing institution first appeared on 27 June 1946, barely three months after the land reform, when PPC adopted the decree of agricultural tax-in-kind, stating:

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[51] Since wartime grain collection system was established in 1930, the colonial government procured virtually the whole grain surplus in rural areas. In 1941-45, for instance, state collection amounted to 62.4 percent of total grain production, demonstrating that compulsory state purchase was the main reason for the chronic food shortages in rural areas. In addition, because state purchase prices were extremely low, even lower than the official prices in Japan, state collection also exacerbated rural poverty (Kim Seung Jun: 1988, pp.74-77). It is therefore hardly surprising that the DPRK farm households would severely oppose the continuation of compulsory grain collection after the country's independence.

<State Grain Purchase Under the Japanese Rule>

(thousand *sok*)

	1941	1942	1943	1944	1945	Average
State Purchase	9,208	11.255	8.750	11.957	9,634	10.161
% of Production	43.1	45.2	55.7	63.8	60.0	62.4

Source: Kim Seung Jun (1988), p.74

The North Korean Provisional People's Committee makes the following decisions to provide food to the North Korean labourers and office workers and secure food reserves.

Article 1. Exempt all the taxes relating to land (land tax and income tax etc) for the North Korean peasants and instead collect 25 percent of harvest (rice, dry-field grains, beans, and potatoes) from farm households for agricultural tax-in-kind. Abolish all the grain procurements.

....

Article 3. Peasants can freely sell their surplus grains after submitting the amounts indicated by tax invoice.

Article 4. People's committees can not impose mandatory grain delivery quotas, apart from 25 percent of the harvest for agricultural tax-in-kind. [52]

As stated by the decree, the primary purpose of agricultural tax-in-kind was to secure state food reserves for urban socialist sector.[53] In this respect it is noteworthy that the tax rate was set at 25 percent of harvest. As mentioned before, those who were entitled to state food rations comprised around 20 percent of total population in 1946. It means that agricultural tax-in-kind could provide not only appropriate food supply for urban socialist sector but also significant food reserves for the government. With the introduction of agricultural tax-in-kind, therefore, the government had the first stable food supply channel, not depending on compulsory quotas, which was necessary for the proper operation of the economy.

Beside this primary purpose, the tax had another important purpose: encouraging agricultural production under small-scale owner farming system. To do this the tax rate was set at 25 percent of harvest, far lower than 50-70 percent of farm rents, and all the existing land taxes were abolished. In addition, mandatory delivery quotas were abolished and private grain trade was re-allowed, giving farm households institutional opportunities to keep a significant portion of their production and realise it in market.

Along with the introduction of agricultural tax-in-kind, Food Administration Bureau [Ministry of Food Administration (MFA) since 1947] and its subordinate departments were established in PPC and local people's committees up to county level in June 1946, organising tax collection procedures. In village the chairman of

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[52] PPC decree no.28, decision on agricultural tax-in-kind, 27 June 1946

[53] Agricultural tax-in-kind was also important for the government revenues. In 1946, for instance, it was the second largest revenue source for the government after drinking tax. Its revenue reached 232

village people's committee was responsible for the procedures. He reported sown areas and average yields by farm households and by lands to higher people's committees, delivered tax invoices, and checked out tax payment situation in village.

In general, tax collection proceeded as follows. Before harvest started, 'harvest assessment committee' was formed with the chairman of village people's committee, harvest assessment personnel and farmers. The committee investigated the expected yields of sample lands and multiplied them by total sown areas to calculate official harvest figures by farm households. Using those figures, MFA issued tax invoices to farm households by the 20th of June for early harvested crops and by the 20th of August for other crops.[54] Corresponding tax payments were made to county people's committees by the end of August and by the 15th of December respectively. And there were strict rules on tax payment: the payment could not be deferred more than 15 days; unpaid tax was confiscated by the security authorities; and for those who reported false figures up to 50 percent of harvest was confiscated.[55]

There are no available data concerning national grain collection through agricultural tax-in-kind. Nonetheless it seems clear that the actual scale of tax collection might well exceed the extent the decrees of agricultural tax-in-kind proclaimed.

Table 3-5. Collection of Agricultural Tax-in-kind

(*gamani*)

	2,466 farm households surveyed by Ministry of Agriculture in 1949[1)]	Inje County in 1946[2)]	Sonchon County in 1946[2)]		
			Rice	other grain	total
Production (A)	150,000	1,478	41,238	14,282	55,520
Tax payment (B)	33,000	364	13,529	6,229	19,759
B/A	22%	24.6%	32.8%	43.6%	35.6%

Source) 1) *Chosun Jonsa*, Vol.25, p.265-266
2) Kim Sung Bo (2000), pp.247-250.

million North Korean won, accounting for 25 percent of total government *revenue*[Research Institute for Asian Culture, *Bukhan Gyungje Tongye Jaroyjip*, 1994, p.114)

[54] People's Committee decree no.24, decision on the change of agricultural tax-in-kind, 12 May 1947.

[55] PPC decree no.110, decision on the violation of agricultural tax-in-kind payment, 18 Nov. 1946

Table 3-6. Agricultural Tax-in-kind: 1946-1966

	27 June 1946 (PPC decree no.28)	12 May 1947 (PC decree no.24)	20 Dec. 1955 (The law of agricultural tax-in-kind)	9 March 1959 (cabinet decree no.124)
Tax	A share of annual harvest	A share of annual harvest	A share of average yields of land	A share of planned harvest
tax-rate	25% for all crops	. rice: 25% . fruits: 25% . other crops: 23%	. paddy-fields: 20-25% . dry-fields: 10-23% . orchards: 23-25%	.paddy-rice: 11-14% .dry-field grains: 3-9% ..potatoes: 6-9% . vegetables: 6-9% . fruits: 14%, etc
Concession and exemption	-	<u>Reduction:</u> Fire-field farm households: 10% of harvest	<u>Reduction:</u> .cooperative farm .(5% of tax) <u>Exemption:</u> .newly cultivated land .private plots in cooperative farms .poor farm household with little land	<u>Exemption:</u> . newly cultivated land . fire-field crops . private plots of cooperative farms . private plots of industrial workers, etc

Table 3-5 presents the actual scale of tax collection in various areas and different years. Consider the survey data of Ministry of Agriculture on 2,466 farm households in 42 rural areas. In 1949 the surveyed areas paid 22 percent of their production for agricultural tax-in-kind. Given 25 percent of tax rate for rice and 23 percent for other crops in that year [see table 3-6], the actual tax rate was slightly lower than the proclaimed rates. Perhaps this was because the surveyed area included many fire-field farm households who paid only 10 percent of harvest for the tax. A similar story is reported by the 1946 tax data of Inje county in Kangwon province. The county had no rice production due to its mountainous geography. Of early harvested dry-field crops, the county paid 24.7 percent for agricultural tax-in-kind. It was also lower than 25 percent stated by the decree of 1946. But the situation was

quite different in Sonchon county, South Pyongan, one of the main rice production areas in the country. In 1946 this county paid 35.6 percent of its rice production for agricultural tax-in-kind. And the rate rose up to 43.6 percent for dry-field crops that farm households preferred to use for tax purpose due to their low market prices. An interesting point is that the authorities launched a tax over-fulfilment campaign in December 1946, which mainly targeted the country's main grain production areas such as South Pyongan.[56]

From those figures and information several conclusions could be drawn. First, the actual tax rates might be different from the officially proclaimed rates. Second, the mountainous areas with less productivity might pay the tax according to the officially proclaimed rates, but the main grain production areas with high productivity were more likely to suffer higher tax rates than the official ones. Third, therefore, in general the authorities might collect more grains than the decrees of agricultural tax-in-kind proclaimed, say, 25 percent of harvest.

3.3.2.2. Grain procurement by Consumer Association

Two months after agricultural tax-in-kind was introduced, the authorities established another food supply channel for urban socialist sector. The idea was that a centralised civil organisation purchased grains from farm households on behalf of the government, providing them to urban socialist sector and the government.

Indeed, on 20 August 1946, PPC delegated the North Korean Consumer Association (NKCA), the national federation of consumer cooperatives,[57] to purchase

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[56] Kim Sung Bo (2000), pp.247-250

[57] NKCA was the first national organisation of spontaneous civil consumer co-operatives that had been already widely formed under the Japanese rule with the purpose to purchase basic necessities and daily commodities directly from the producers and provide them to the members at cheap prices. Since its establishment on 20 May 1946 the NKCA grew rapidly. The number of its members that started with 1 million doubled up to 2.3 million by the end of 1946 and further increased to 4.9 million in 1947 (Cho Hong Hui: 1948, p.1), comprising for about 30 percent of total population.

In viewpoint of state grain collection NKCA was the most appropriate organisation to replace administrative organisations for two aspects. First, it was basically a peasant organisation. Of its total members in 1947, peasants accounted for 67.6 percent and, of its 1259 shops, 75 percent located in rural areas (Kang Jin Gun: 1948, p.8). Second, because Nationalisation Act of Major Industries was announced in August 1946, NKCA was under the direct control of the government in the sense that state sector was the biggest supplier of industrial goods that were tradable in rural areas. This meant that the authorities could easily control the procedures and terms of trade that NKCA carried out in

150 thousand tons of grains from farm households, proclaiming that the whole administrative organisations would provide necessary resources for the NKCA grain procurement.[58] Each province people's committee was allocated its own procurement target that it had to help NKCA meet in its jurisdiction. Industry Bureau of PPC was given the responsibility to produce and supply industrial goods for NKCA to exchange grain with. Agriculture and Forest Bureau and Transportation Bureau were assigned to provide warehouses and transportation facilities for the custody and delivery of grain.

Not surprisingly local administrators utilised coercive methods in order to accomplish its procurement targets. Like in the compulsory collection campaign in the winter of 1945-46, mandatory grain delivery quotas were imposed on farm households; and county bureaucrats were sent to rural NKCA shops to supervise grain delivery. Those who sold their grains to NKCA was forced to receive coupons, instead of industrial goods, when industrial goods were not supplied as planned. Unlike in the previous campaign, however, coercive methods did not work well in this campaign. Hoarding and speculation of grains were common in most rural areas, and even some farm households explicitly refused the compulsory sales. Indeed actual grain delivery remained at only 8 percent of the target even a month after the campaign commenced.[59] On 26 December, therefore, PPC officially admitted the failure of the campaign and announced that thereafter the NKCA grain procurement must be based on the voluntary grain sales of farm households.

> Provisional People's Committee decided to.... allocate the amounts of grain procurements to each provinces in Provisional People's Committee decree No. 673. But the allocations were comprehensive numbers and they did not mean to impose mandatory delivery quotas on farm households...In spite of that, the Consumer Association is executing the grain procurement project in wrongly commanding and bureaucratic ways to allocate the grain procurement quotas to every farm household. This is a big mistake..... To eliminate the command and bureaucracy in the grain procurement project and achieve the project in the planned period the following decisions are made.

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rural areas. It also meant that most grains that NKCA purchased from farm households were utilised for state purposes.

[58] PPC decree no.63, decision on the grain procurement of the consumer association, 20 August 1946

[59] PPC decree no.140, on grain procurement project, 26 December 1946

> One. The chairman of each provincial people's committee should immediately cancel the assertive and bureaucratic method of procurement and any method that included compulsory factors, and carry out the project in the principle of absolute voluntarism.....[60]

According to this decree the NKCA grain procurement was carried out without compulsory factors until it was replaced by state grain marketing system in 1955. The evidence is that the scale of the NKCA grain procurement remained minimal. In 1946, for instance, total grain collection by NKCA was around 25 thousand tons, comprising only 1.5 percent of total production.[61]

Despite its small scale the NKCA grain procurement was important for several reasons. First, it helped stabilise market grain prices. The NKCA grain prices were maintained at 30-35 percent of market prices and, when necessary, the government utilised NKCA shops to participate in market trade so as to stabilise market prices. Second, it enabled the authorities to adjust state food reserves more flexibly in response to the unexpected changes in food demand. Third, it provided urban socialist sector with additional grains at almost state rationing prices.

3.3.2.3. Farmers' markets

An important feature of the new agricultural marketing institutions was that they incorporated market as an essential part. Before the institutions were established, most farm households had had little surplus that could be sold in market. This is because state collection absorbed virtually the whole agricultural surplus from rural economy. During the Japanese rule in 1941-45, for instance, the colonial government collected 62.4 percent of total grain production on annual average [see the table in footnote 51]. In 1945-46 the socialist government also collected the whole grain surplus from rural economy. But the situation changed completely as the new grain marketing institutions appeared. Agricultural tax-in-kind was set at 25 percent of harvest and the NKCA procurement was maintained at minimal level, say, mere 2 percent of production in 1946. It means that the share of state collection in total production dropped below half of the colonial period in 1941-45. Under the new institutions,

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[60] Ibid
[61] *Chosun Jonsa*, Vol.23, P.413

therefore, there must remain a considerable amount of surplus in village even after completing state collection. In this sense the existence of market to realise the surplus was essential for rural economy.[62]

Between 1945 and 1953 state market policy was twofold. On the one hand the authorities imposed heavy regulations on trade items and prices. On the other hand however the authorities increased the number of markets and their trade volumes in order to boost the transfer of rural surpluses to urban industries. As a result, there appeared an interesting form of market called farmers' market that was organised and operated by administrative organisations.

State market policy began with heavy regulations. On 4 October 1946, shortly after private grain trade was restored, PPC announced another decree to severely limit the extent of the trade: [63]

> One. Allow free grain trade in principle. But prohibit the trade among grain merchants and the wholesale trade that intend to concentrate grains....
> Two. Prohibit all grain exports and deliveries to outside North Korea in any cases.
> Three. Prohibit trading grains in advance before harvests.
> Four. The production, processing and sale of food, foodstuffs, alcohol made out of main grains (rice, dry-filed grains, potatoes) must win the approval of the chairman of province, city, county people's committee.

Administrative price control was also put in place. In December 1946 'price control committee' was formed in PPC and local people's committees up to county level. The committee set the limits of market prices and cancelled the trade violating the limits.[64] Both state retail shops and NKCA shops were mobilised to stabilise market prices. Due to those regulations market prices fell sharply. Between 1947 and 1948, for instance, retail prices in Pyongyang dropped by almost 40 percent on average. And grain price had the biggest fall.

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[62] According to the survey data of Ministry of Agriculture, 2,466 farm households produced 150 thousand *gamani* of grains and sold 22 thousand *gamani* to market in 1949 (*Chosun Jonsa*, Vol.23, p.265-266). Of total production, roughly 15 percent was sold to market. (In 1944 they sold only 2 percent of production to market). Given that the farm households paid 33 thousand *gamani* for agricultural tax-in-kind in that year, the amount of grain sold to market surely was not so small.
[63] PPC decree no.93, decision on free grain trade, 4 October 1946
[64] *Chosun Jonsa*, Vol.23, p.409

On the basis of this market stabilisation, the authorities launched a series of market reforms in 1948-50 in order to institutionalise and encourage market trade. The reforms brought about several important changes. First, all existing small-scale markets changed into either constant markets or regular markets with greater scales and more marketing days.[65] Secondly, the number of markets increased from 386 in 1946 to 475 in 1948, including 382 constant markets and 93 regular markets. Thirdly, local people's committees were given formal responsibilities to provide all the necessary resources for market operations in their jurisdictions. Fourthly, the roles of administrative organisations in markets were specified. All local people's committees made 'regional market management rules' by 1950 and, according to those rules, established their branches in markets called 'market management station'. The station had two roles: 1) providing all the necessary resources and funds to open and operate market; 2) collecting market fees from merchants and farm households, monitoring trade items and prices, maintaining security and order, and supervising the operations of state retail shops and NKCA shops in market.

Completing those reforms, the authorities finally created farmers' markets in 1950. Farmers' markets had the same structure with existing markets. A difference is that in farmers markets farm households sell their surpluses to final consumers without the intervention of merchants.[66] It is these farmers' markets that have existed as the only agricultural markets until present time.

Table 3-7. Retail Price Index, Pyongyang: Nov.1947 – April 1948

	Nov.1947	Dec.1947	Jan.1948	Feb.1948	Mar.1948	Apr.1948
Cereals	100	87	66	57	50	44
Clothing	100	90	63	64	56	53
Daily necessities	100	66	79	74	69	65
Fuel	100	92	71	74	58	49
Fish, meat	100	82	78	84	75	59
Foodstuffs	100	105	84	90	78	68
Lumber	100	80	97	106	82	82
Other	100	53	63	66	71	73
Average	100	82	76	77	61	62

Source: Scalapino and Lee (1972), p.1027

[65] Kim Won Sam (1958), p.303. Constant markets had more than 150 marketing days per year while regular markets had less than 150 marketing days.
[66] Cabinet decree no.9, decision on the establishment of farmers' markets, 11 October 1950

3.4. The establishment of State food rationing system

Between 1945 and 1955 the authorities laid the foundation for state food rationing. The rationing was initially taken as a temporary measure to mitigate the food shortage of 1945-46, but soon transformed into a permanent institution as the new agricultural marketing institutions were created. In its structure and function the rationing system does not differ greatly from the present PDS.

3.4.1. The formation of state Food Rationing

State food rationing system was established through three steps: 1) provincial rationing: 2) temporary national rationing: 3) national rationing as a permanent institution.

Food rationing was first introduced in October 1945 when province people's committees banned the operation of grain merchants and prohibited grain trade in order to resolve the urban food shortage. All grain possessed by the Japanese government, people, organisations and Korean grain merchants were confiscated and rationed for urban dwellers. To collect grain and organise rationing procedures 'food supply committee' was formed in province and city people's committees. In labour district 'food management station' was in charge of food distribution. At this time the rationing proceeded within the territory of province with locally available food according to the norms made by province people's committees.

Provincial rationing was transformed into national one in February 1946 when PPC declared that food must be temporarily rationed across the country according to a nationally unified norm in order to "overcome the food crisis caused by extreme food shortages in North and South Hamgyung and South Pyongan".[67] The national rationing norm classified urban dwellers into 4 categories according to their ages and works, setting different rations by categories from 600 grams per person per day to 300 grams.

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[67] PPC decree no. 2, Provisional People's Committee decision on food policy, 27 February 1946.

In labour district food management station was still in charge of food distribution. In city and province however food supply committee was renamed as emergency food committee, being subordinate to the same committee in PPC. Emergency food committee in PPC had two roles: 1) setting a national rationing norm; 2) organising inter-provincial grain trade to ensure that national standard rations were supplied evenly across the country. It was however still each province people's committee that had practical responsibility to provide state food rations to the population.

Table 3-8. State Food Rationing: 1946-1954

	Recipient	Daily Ration
27 Feb 1946	Labourer, office worker, and their dependants	band 1: heavy labourer; 600gr band 2: labourer; 500gr band 3: office worker; 400gr band 4: dependants; 300gr
19 Oct. 1946	Labourer, office worker, and their dependants	special band: 900gr band 1: heavy labourer; 750gr band 2: labourer; 600gr band 3: office worker and student; 525gr band 4: dependants; 450gr
26 Dec.1946	Those who work in state organisations, state enterprises, and private firms that the state regards as important, and their dependants	band 1: heavy labourer; 700gr band 2: labourer; 600gr band 3: office worker; 500gr band 4: dependants; 300gr
12 July 1947	Private firms are entitle to rations only for the period that they are directly involved in state economic planning.	-
27 March 1952	Those who work in state sector, industrial collectives, private firms that the cabinet approves; and their dependants.	band 1: heavy labourer; 900gr band 2: heavy labourer: 800gr band 3: labourer; 700gr band 4: office worker, 600gr, band 5: student in senior high school etc; 500gr band 6: student in primary or junior high school; 400gr band 7: infants in nursery; 300gr

Source:
1) PPC decree no.2, People's Provisional Committee decision on food policy, 27 Feb 1946
2) Food Administration Bureau decree no.2, On the coupon system according to the ratings, food rationing system, 19 Oct. 1946
3) PPC decree no.141, On food rationing, 26 Dec. 1946
4)People's Committee decree no.55, decision on the grain rationing prices for labourers and office workers in private firms, 12 July 1947
5) Cabinet decree no.56, Rules on state food rationing, 27 March 1952

Food rationing was finally transformed into a permanent institution as the decree of agricultural tax-in-kind was announced in June 1946. The decree stated that the purpose of agricultural tax-in-kind was to provide state food supply to urban industrial sector. More importantly, it proclaimed that Food Administration Bureau in PPC and its subordinate departments in local people's committees, the new ministerial hierarchy in charge of agricultural tax-in-kind, was also responsible for the allocation of food that was collected from the tax. This meant that state food rationing, though introduced as a temporary measure to mitigate the food shortage of 1945-46, would not disappear in so far as agricultural tax-in-kind was maintained. Since then, state food rationing has been one of the most important economic institutions in the DPRK until present time.

3.4.2. Rationing Norms

Initially food rations were supplied to all urban dwellers, including those who worked in private firms and organisations. In December 1946 however limitations were imposed on the qualifications of the recipients; and the limitations subsequently intensified. During this period, though some changes found in details, the main recipients of state rations were labourer and office workers in state sector and the members of industrial collectives. Those who worked in non-socialist sector were entitled to state rations only when they were directly engaged in the economic activities assigned by state economic plans. In this respect state food rationing mainly covered urban socialist sector that employed around 25 percent of total population.

Food rations were determined by a fairly egalitarian rule. Only two factors were considered: recipient's age and the degree of physical demanding of his work. The authorities determined first a basic ration for adult with least physically demanding work, say, office worker. On the basis of this ration, fewer rations were given to children and more to those with more physically demanding work. Not surprisingly food rations gradually increased over this period, and rationing bands got more specified until the 1952 rationing norm had 7 rationing bands and 600 grams of basic adult ration. This rationing norm has in principle remained unchanged until present time.

In general, food rationing proceeded as follows. [68] By the 5th of every month the managers of firms that were entitle to state food rations reported their monthly ration requirements to city food administration department. Reviewing the requirements with rationing registration books containing the names of recipients, the department reported the city's aggregate ration requirements to the chairman of province people's committee by the 12th of that month. The report must include the information about the food reserves of the city. Then the chairman ordered province food administration department to make provincial food allocation plan, having its approval from Ministry of Food Administration by the 18th of the month. The approved plan was sent to city food administration department by the 25th of the month. According to this plan, the department adjusted food reserves among food management stations in labour districts and ordered the managers of firms to issue ration-coupons to their employees by the end of the month. With those coupons individual workers purchased their rations biweekly - on the 15th and the 30th of every month- at food management stations they were registered to.

Table 3-9. The Composition of Population by Social group: 1946-53

(%)

	1946	1949	1953	Average
Labourer	12.5	19	21.2	17.6
Office worker	6.1	7	8.5	7.2
Member of collectives	-	0.3	0.5	0.4
Merchants	3.3	1.7	1.2	2.1
Entrepreneurs and self-employs	1.7	0.9	0.7	1.1
Peasants	74.1	69.3	66.4	69.9
Others	2.2	1.8	1.5	1.8
Total	100	100	100	100

Source: *Chosun Joongang Nyungam* [DPRK Central Yearbook], various years

3.4.3. The Roles of Food Rationing

State food rationing had several important roles particularly for the socialist government in its early stage. First, it helped the authorities maintain the country's food balance. By the early 1950s the DPRK had faced on-going food pressures.

[68] Ministry of Food Administration decree no.5, rules on food rationing, 6 Jan 1947

Although grain production began to increase from 1946, it was still below the 1994 level under the Japanese rule [see table 3-11]. State food rationing controlled urban food demand and thus helped avoid another possible food crisis.

Second, the rationing stabilised grain market. In its early stage the socialist government faced extremely volatile grain market. At the end of 1946, for instance, market rice price rose up to 1000 yen per small *mal* (7.5 kg) while an average urban worker earned only 400-550 yen per month.[69] Food rationing fulfilled basic food requirements in urban areas and thus, together with administrative price guidance, dramatically reduced market food prices as shown by table 3-7.

Third, the rationing was important for labour controls in state enterprises. The authorities set standard food rations for state employees and provided them with more or less rations than the standards according to their working days and performance.[70] Given no firmly established incentive systems in state enterprises yet, food rations must be of great importance in motivating state employees.

Fourth, the authorities utilised food rations to control the remaining urban private sector. For instance, the authorities provided state food rations to private firms when they operated according to state economic plans. To encourage collectivisation movement in urban private sector, industrial collectives were also included in state food rationing in March 1952.

3.5. Agricultural Resource Shortage and Administrative Production Guidance

Between 1945 and 1953 the DPRK government planned agriculture. The authorities imposed production targets on farm households and allocated state agricultural resources accordingly. Compared with its current form, however, the planning had two basic differences: 1) state targets were not compulsory; 2) the authorities did not

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[69] Scalapino and Lee (1972), p.1032

[70] For instance, those who belonged to rationing band 1 (750 gram per day) in December 1946 received the ration of special band (900 gram) when they fulfilled their production targets by 110 percent. Similarly they received the ration of band 2 (600 gram) when they failed to meet the targets by 100 percent (Food Administration Bureau decree no.2, On the coupon system according to the ratings, food rationing system, 19 Oct. 1946)

involve the operations of farm households. In this section we study how this planning pattern appeared.

3.5.1 Agricultural Resource/Input Shortage

During the Japanese rule the DPRK had suffered an ongoing shortage of agricultural inputs such as drought animals, farm equipment, fertiliser and water supply. In 1943, for instance, the northern part of Korea had only 676,618 drought animals, roughly one animal per two households. Moreover, due to the ongoing compulsory animal collections by the colonial government the figure dropped to 449,657 by 34 percent in 1945.[71] In consequence, around 54 percent of total farm households had no drought animals when they started the 1946 spring planting. The supply of farm equipment and fertiliser was also extremely low. In 1945 an average farm household had only 0.29 ploughshares, 1.81 weeding-hoes, 1.48 sickles and no farm machinery.[72] In 1937 chemical fertiliser consumption per *chungbo* was mere 20 kg, which did not change significantly until 1945.[73] The shortage of irrigation facilities was another problem: due to the absence of stable water supply so-called 'dry planting [*gunjikpa*]' was common even for rice production in many rural areas.

This input shortage much worsened after the country's independence. As land reform was publicly acknowledged, many landlords slaughtered their animals and destroyed their seed grains. Hence there were unprecedented seed and animal shortages in the 1946 spring planting.[74] And the shortages were not resolved fully until the 1948 spring planting.

The difficulty was that newly emerged owner farmers were mostly too poor to afford new seeds, drought animals, fertilisers, and farm equipment. To resolve the ongoing input shortages, therefore, state intervention was necessary. Indeed the government took three important measures concerning state resource supply to agriculture between March and September 1947. First, it monopolised all agricultural input supplies. Due to the 1946 land reform that nationalised 1,165 irrigation facilities, 2,692 *chungbo* of orchards and 3,432,986 *chungbo* of forests, the

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[71] Lee Sun Keun, some issues on North Korea's agricultural development, *Inmin* [people] I-1, 1946
[72] *Chosun Jonsa* Vol.24 p.130
[73] Ibid, p.130

government already appeared as the biggest owner of agricultural resources. In addition, it monopolised the supply of industrial goods to agriculture on 24 August 1946 by announcing the Nationalisation Act of Major Industries. On 26 September 1946 fertiliser trade was brought under state control,[75] and on 9 September 1946 all the irrigation facilities across the country were effectively nationalised.[76]

Second, the government improved its resource supply capabilities in agriculture. On 1 April 1946 the North Korean Peasant Bank was established, starting to provide financial supports for farm households to purchase drought animals, seeds and farm equipment. Several farm equipment manufactories were established in Pyongyang and a series of national irrigation projects were launched throughout the year.[77]

Third, the government established administrative channels to allocate state agricultural resources/inputs among farm households. At this time province and county people's committees owned most state agricultural resources, allocating them according to private contracts with farm households. From the 1946 spring planting however all the contracts with farm households were exclusively carried out by the MOA hierarchy, being strictly subject to state agricultural plans.

Owing to the above policies all agricultural input supplies went under state control by September 1946. It was this state control of inputs that enforce newly established small-scale owner farming system to operate according to state agricultural plans in 1946-53.

3.5.2. Early Quantitative Planning

Between 1945 and 1953 the DPRK had a ministerial system in agriculture. At the top of the hierarchy, Agriculture and Forest Bureau in PPC [Ministry of Agriculture (MOA) since 1947] was in charge of economic planning and resource allocation in agriculture. In province and county people's committees MOA's branches (agriculture departments) specified and distributed national plans/targets among farm households.

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[74] Ibid, p.356-357; PPC decree no.7, the decree on the preparation for spring planting, 15 March 1946
[75] PPC decree no. 86, the provisional law of fertiliser trade, 26 September 1946
[76] PPC decree no. 75, the decree on state management of irrigation facilities, 9 September 1946
[77] *Chosun Jonsa* Vol.24 p.357-59

In village the chairman of village people's committee was responsible for supervising the operations of farm households.

Using this ministerial hierarchy the authorities initially attempted a centralised quantitative planning. The primary purpose of the planning was to increase agricultural production, and the imposition of quantitative production quotas and corresponding (state) resource allocations were the main policies to enforce state plans to producers.

The planning started on 15 March 1946 when PPC announced the decree of the 1946 spring planting, specifying both provincial targets for sown areas by crops and corresponding resource allocation plans.[78] And it ordered provincial administrators to make more detailed figures at county level until 30 March 1946. According to this decree, in the early April the provincial authorities ordered the county authorities to prepare for the spring planting. An order made by South Hamgyung province party committee to county party committees stated:

1. Making production plans
   a. organising village conferences by villages
   b. correctly surveying this year's sown areas
   c. making plans to plant appropriate crops to appropriate lands
   d. making production plans and, on the basis of the plans, informing farm households of their responsible production quotas (establishing production responsibility system)

   .....

2. The issue of organising production brigade
   a. organising it by villages, with smart members of youngsters, adults and women in Peasant Committee, making it the model of peasants in front of production so as to mobilise all peasants. .....[79]

On the basis of this order, county administrators specified sown areas and crop compositions by villages. Furthermore, they made concrete production quotas by villages and ordered village people's committees to distribute the quotas among farm households. To do this each village people's committee carried out three tasks. First, it organised 'production teams [*sangsanban*]' and imposed state production quotas on

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[78] PPC decree no.7, the decree on the preparation for spring planting, 15 March 1946

them. Each production team consisted of 5-6 farm households, pooling seasonally labour, animals and other agricultural assets to conduct joint farming. After the land reform the basic production unit in agriculture was owner farm households who owned their land and carried out independent farming. It was therefore difficult for village people's committee to control individual farm households directly. Hence the committee forced farm households to join production teams, controlling their operations collectively rather than individually. Second, the committee organised 'production increase brigades [*sangsan jungsan dolgyukdae*]' with young farmers in village. Its purpose was to provide good-quality labour support to production teams and thus encourage farm households to join them. Finally, the committee made concrete production and resource allocation plans for production teams.

As the result, the 1946 spring planting was carried out in highly centralised and administrative manners: MOA → MOA branches in province and county people's committee → village people's committee → production teams → farm households.

Table 3-10. Production Teams and Production Increase Brigades: 30 May 1946

	Production Teams		Production Increase Brigades	
	number	member	Number	member
South Pyongan	13258	261315	2498	115591
North Pyongan	17865	303695	2938	153795
South Hamgyung	20965	213815	2272	30319
North Hamgyung	7248	25185	2235	30900
Hwanghae	9518	262314	4686	126348
Kangwon	10635	207219	2135	29365
Total	79489	1274243	16764	486318

Source) *Chosun Jonsa*, Vol. 24. P.360

In viewpoint of individual farm households state plans were not compulsory. They had no legal obligation to fulfil the production quotas of production teams. They could even refuse to join production teams. In this sense the 1946 agricultural planning was fundamentally different from the present planning in which producers have legal obligations to meet state targets.

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[79] South Hamgyung Province Party Committee, the order on spring planting preparation, 18 April 1946, quoted in Kim Sung Bo (2000:p.235)

Nonetheless it seems obvious that farm households' decisions were strictly binding to state agricultural plans because all state resource supplies, including farm equipment, fertiliser, drought animal and water supply, were based on them. In particular, the authorities began to organise 'production guidance teams [*sangsan jidodae]'*, which temporarily mobilised urban and industrial labourers to support agricultural production, from the 1946 spring planting.[80] On 28 May 1946, for instance, Wonsan city people's committee formed 'city planting guidance team' consisting of 30 city officials, sending around 40,000 urban labourers to neighbouring rural areas to help the spring planting until 15 June. Because these labour supports were provided only to production teams, it was common for farm households to join the teams particularly during farming season.

3.5.3. The Establishment of Administrative Production Guidance

The centralised quantitative planning continued until 1948. But they caused several problems.[81] First, the joint farming by production teams undermined labour morals particularly among middle and rich farm households who had higher productivity. Second, the production plans made by the authorities frequently ignored concrete agricultural conditions. Third, as the authorities focused on organising production teams and brigades, little attention was given to technical problems farm households faced. As the result, agricultural production did not increase fast. For instance, grain production reached 1.9 million MT in 1946 and 2.1 million MT in 1947. But both figures were still much lower than 2.4 million MT in 1944 under the Japanese rule, indicating that the country was still under food pressure.

In this circumstance the authorities made important changes in agricultural planning between 1948-53. Above all, the purpose of the planning was changed into simply motivating farm households to increase their production.[82] In 1946-47 agricultural plans consisted of real production targets that farm households were supposed to fulfil, even though they were not compulsory. To meet the targets the authorities focused on organising and controlling the operations of farm households.

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[80] *Chosun Jonsa* Vol.24 p.362-65
[81] Cabinet decree no.10, the decree on the 1949 agricultural planting works, 9 February 1949
[82] Oh Dae Ho (1985) p. 4-11

By contrast, agricultural plans after 1948 aimed to provide farm households with the broad prospects of agricultural development. And the production targets in the plans were merely to motivate farm households to increase their production according to the country's needs. To realise the targets the authorities promoted competitions among farm households rather than controlled their operations.

As the planning purpose was changed, the authorities stopped imposing concrete production plans and instead encouraged individual farm households to make their own plans.[83] In consequence, there were great changes in planning procedures. Up to county level the planning proceeded in the same manner as before: the MOA plans were specified and distributed among villages through administrative hierarchy. In village, however, the village people's committee did not impose production quotas on production teams. Instead, it informed individual farm households of village production quotas and encourage them to make and report concrete production plans to increase their production and so meet the village quotas. And one of the important roles of the committee was to monitor whether individual farm households carried out production according to their own plans. In consequence production teams did not function as the basic production units any more and so, together with production increase brigades, were gradually dismantled and replaced by voluntary joint production teams such as traditional 'cow sharing teams [*sogyuri*]' and 'labour sharing teams [*pumasi*]'.

The role of the government was also changed into providing technical supports to farm households, including the development of new technologies, new seeds, farm machinery and irrigation facilities etc. In 1949, for instance, the authorities held 15,416 agricultural technology conferences in which 986 thousand farmers participated.

In short, the DPRK agricultural planning after 1948-53 proceeded in the way that the government gave a broad prospect of agriculture and, in order to realise the prospect, provided state resources and technologies to farm households who made and executed their own production plans. In this respect we call this planning 'administrative production guidance'.

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[83] *Chosun Jonsa* Vol.25 p.75

Table 3-11. Grain Production in 1946-53

(1000 MT)

	1944	1946	1947	1948	1949	1951	1952	1953
Grain Production	2417	1898	2069	2668	2654	2260	2450	2327

Source) *Chosun Joongang Nyungam*, various years

3.6. Conclusion

The discussion of this chapter could be summarised as follows.

1. Between 1945 and 1953 the DPRK had small scale owner farming system in which a vast number of owner farm households carried out independent farming activities. The system was quite similar to private farming system in market economy but at the same time had two basic differences: 1) farm households could not invest in land and so their farming scale could not exceed the boundary of their family labour force; 2) farm households were under some degree of administrative control in both production and marketing.

2. The 1945-46 food crisis made state grain collection the most urgent and important task for the new socialist government to tackle. However, as small scale-owner farming system was established, it was difficult for the government to impose compulsory grain delivery quotas on farm households. To resolve this difficult the government introduced three agricultural marketing institutions: 1) agricultural tax-in-kind; 2) the voluntary procurement of the consumer association; 3) farmers' markets.

3. To overcome the food crisis the government initially introduced a temporary food rationing. But the rationing was soon transformed into a permanent economic institution as the government established secure food collection channels such as agricultural tax-in-kind. In 1946-53 the DPRK food rationing covered mainly socialist

sector that comprised roughly 25 percent of total population and 84 percent of urban population.

4. The DPRK suffered the ongoing agricultural input shortage in 1946-53. To mitigate this shortage the government monopolised the input supply to agriculture, on the one hand, and improved state input supply capabilities on the other hand. This state monopoly of agricultural input supply made it possible for the government to plan the agriculture under small-scale owner farming system. In compared with the current form, however, the role of agricultural planning in this period was confined to providing the producers with production guidelines such as the broad pictures of future agricultural development and various technical assistance.

IV. Cooperativisation, the 1954 Food Crisis and New Agricultural Management System: 1953-73

4.1. Introduction

In this chapter we study the institutional changes in the DPRK agriculture from the beginning of agricultural cooperativisation in 1953 to the establishment of so-called the new agricultural management system in 1961. The agricultural institutions established in 1963-61 had not changed until *Juche Nongbub* was introduced in 1973. Hence the discussion of this chapter effectively covers the DPRK institutions between 1953 and 1973.

The years of 1953-61 saw that the basic structure of the present DPRK agriculture was formed. In 1953-58 agricultural cooperativisation was completed, making cooperative farms the basic production units in agriculture.[84] State grain marketing commenced in 1957-59 and state food rationing expanded to the whole population, including farm households, in 1954-58. State agricultural plans that impose mandatory production and delivery targets on cooperative farms began in 1956, and the planning institutions consisting of Agricultural Commission, PREC and CCMC appeared in 1961.

Newly established institutions in this period were fundamentally different from those in 1945-53. As private farming was replaced by cooperative farming, all the farm operations from production to marketing went under direct state control. Grain trade was monopolised by state procurement agencies and thus the roles of agricultural markets reduced to circulating minimal amounts of non-grain foodstuffs coming from the small private plots of farm households. Because state rationing expanded to the whole population, the authorities had not only the power to control

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[84] The DPRK authorities called their farms collectively owned by farm households 'cooperative farms [*hyupdong nongjang*]' rather than 'collective farms [*jipdan nongjang*]', and the historical process of establishing the farms 'cooperativisation [*hypdongwha*]' rather than 'collectivisation [*jipjdanwha*]'. There are of course no meaningful differences between those words. In this thesis we follow the official DPRK terminology, using 'cooperative farms (or simply cooperatives)' and 'cooperativisation'.

the food consumption of each household but also the responsibility to feed the whole country.

But the underlying rationale for the institutional changes remained unchanged. As in 1945-53, all the agricultural institutions in 1953-61 were formed to resolve the country's ongoing food pressures and agricultural resource shortages. Indeed, the country faced another food crisis in the winter of 1954-55, which triggered the appearance of state grain marketing and the expansion of state food rationing to farm households. And the agricultural resource shortages after the Korean War made the 1953-58 agricultural cooperativisation inevitable, eventually leading to the establishment of the new planning institutions in 1961.

The purpose of this chapter is to show this underlying rationale for the institutional changes in this period. To do this it is organised as follows. Section 4.2 discusses the relation between the post-war resource shortages and cooperativisation movement in agriculture. Section 4.3 examines the state grain collection problem in the early 1950s, which was dramatically expressed by the 1954-55 food crisis, and examines how the problem changed the previous agricultural marketing and food rationing institutions. In section 4.4 we study so-called the new agricultural management system that created the localised agricultural planning institutions in which province administrators controlled agriculture independently. Finally section 4.5 summarises this chapter.

4.2. Agricultural Resource Shortage and Cooperativisation Drive

Small-scale owner farming that was created by the 1946 land reform declined rapidly after the Korean War. In 1953, the year of armistice, it was still predominant, contributing 92 percent of total agricultural output.[85] However, as agricultural cooperativisation was launched in August 1953, farm households were rapidly absorbed by newly established cooperatives and small-scale owner farming had completely disappeared by August 1958. Since then cooperative farming has constituted the basis for all the DPRK agricultural institutions.

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[85] Chung (1974), p. 11

4.2.1. Agricultural Resource Shortages and Early Cooperativisation Drive

The Korean War that lasted for over three years between 1950 and 1953 saw a drastic decline in agricultural production and fundamental changes in its structure.

During the war agricultural production declined rapidly. Between 1949 and 1953 grain production fell by 15 percent, and it did not recover the pre-war (1948-49) level until 1956. The number of cattle fell by 36 percent and the number of pig by 18 percent. Sericulture production also declined by 38 percent.

Table 4-1. Agricultural Production During and After the Korean War: 1949-1960

	1949	1951	1952	1953	1954	1955	1956	1957	1958	1960
Sown Area (1000 *Chungbo*)	2836	2101	2253	2295	2337	2325	2413	2555	2744	2765
Grain Production (1000 MT)	2654	2260	2450	2327	2230	2340	2873	3201	3700	3803
Number of animals (1000)										
(cattle)	788	546		504			484	569	667	672
(pig)	660	309		542			710	1339	1441	1123
Sericulture production (1949=100)	100			60			102			185

Source) *Chosun Joongang Nyungam*, various years

Due to this decline in production most farm households were impoverished. Before the war a vast majority, 72-3 percent, of farm households were classified as middle farm households that could manage their livings without state supports. Of them, the half was defined as 'upper middle' that produced considerable agricultural surpluses while another half was 'lower middle' that had little surpluses. Although rich farm households that sold most their products to markets accounted for the relatively low portion, 2-3 percent, of total farm households, poor farm households that could not manage their livings without state supports were also below 25 percent of total farm households. During the war however the share of middle and rich farm households declined to 59.4 percent and 0.6 percent respectively, while that of poor

farm households increased up to 40 percent.[86] Furthermore, of middle farm households, most 'upper middle' households turned down to 'lower middle'. It means that a majority of farm households faced difficulties to maintain their livings even at bare subsistence levels.

The important consequence of this impoverishment was that small-scale owner farming had begun to be dissolved during the war. Many poor farm households that had their family resources depleted formed various cooperatives, pooling resources, conducting joint production and sharing products.[87] Those who did not participate in cooperatives tended to transform their family members into seasonal or permanent farm labourers. Poor farm households were also driven out of independent production and marketing due to increasing debts.[88] They had to submit large shares of products to rich farm households under long-term debt contracts that were quite similar to tenancy contracts before the land reform.

By contrast, though their numbers decline, rich farm households turned into capitalistic commercial farmers as well as professional merchants. They employed growing number of farm labourers to expand their own production, primarily rice and

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[86] *Chosun Jonsa* Vol.28 p. 184.

[87] During the war there were three types of work teams that were agricultural cooperatives in a germinal form. First, farm households facing animal and labour shortages voluntarily formed "ox-sharing teams" and "labour-exchange teams". Compared to those before the war, they had fixed members and operated throughout the year. And the charges for labour and animal were paid by labour, not money or products. These teams were the most common form of pooling rural resources during the war. In South Pyongan, for instance, there were 33,523 labour-exchange teams and 6,151 ox-sharing teams in 1952, incorporating 357,715 members (*Chosun Jonsa* Vol.27 p. 207). Second, local authorities organised "good harvesting groups" with those farm households who sent their family members to the front and thus suffered from labour shortages. They conducted joint farming under the guidance of local authorities. Third, in the North-South Korean border provinces such as Kangwon and South Hwanghae where the battle was fierce, farm households formed wartime mutual work brigades that were agricultural cooperatives in traditional sense. They unified land into communal property, pooled animals and agricultural implements and carried out joint production under the guidance of representative committee consisting of 9 elected members. And the output distribution was made solely according to labour, regardless of previous land-holdings, animals and other possessions.

[88] The authorities were particularly concerned about the following adverse impacts of rural debts on small-scale owner farming. First, rich farm households loaned money to poor farm households and in return collected their products in harvest season. Second, they forced the indebted farm households to produce what they needed. Third, they let the indebted farm households pay the debts by animals or rear animals on their behalf. Fourth, they demanded seasonal or permanent farm labourers from the indebted farm households. In consequence, many poor farm households could not carry on independent farming during the war. Hence the authorities cancelled in October 1952 all debt contracts that influenced agricultural marketing in harvest season and provided in February 1953 additional land, animals and seeds to poor farm households in serious debts (cabinet decree no. 188, on preventing high-interest loans to poor farm households in rural areas, 30 August 1952; cabinet decree no. 26, on the policies to improve economic situations of poor farm households and petty fishery households,18

vegetables for urban markets, entrusted their production to poor and middle farm households, and controlled agricultural markets where the government regulations were considerably weakened during the war.

Not surprisingly the destabilisation of small-scale owner farming caused great concerns about whether it should and could be sustained after the war, which eventually led to a dispute in the communist party over the post-war agricultural structure, particularly the timing and speed of agricultural cooperativisation.

During the war a majority of the communist party was in favour of early cooperativisation. But there was an opposition, too. According to the opposition view early cooperativisation was unrealistic in the sense that agricultural mechanisation, which was essential to large-scale cooperatives, was limited. Proceeding cooperativisation confined in the northern part of Korea could undermine the possibility of Korean reunification and thus be politically risky. To rehabilitate the post-war economy therefore this view emphasised the early revival of small-scale owner farming.

> Free merchandising would give a huge boost to small-scale farming that had no incentives to increase production. When free merchandising revives agriculture, which in turn influences manufacture and transportation, the whole economy will revive and improve.[89]

Despite this opposition, however, the party decided to launch a pilot cooperativisation program in August 1953, barely a month after the armistice treaty was concluded. And it was soon followed by a full-scale cooperativisation drive in November 1954. By August 1958 all farm households had been absorbed by new cooperatives, and it was officially announced in January 1959 that agricultural cooperativisation was completed in the DPRK.

Why did the authorities rush into agricultural cooperativisation right after the war? Many factors could be attributed to it. For instance, the years of 1953-54 saw the best political chances for agricultural cooperativisation. Increasing poverty in rural economy made a majority of poor farm households favourable to cooperativisation

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February 1953). Nonetheless, the rural debt problems did not disappear until the end of war, which was one of the reasons for the early promotion of agricultural cooperativisation.

[89] Kim Kwang Soon, the theory of Lenin's New Economic Policies and its implication in world history" [in Korean], *Gyungje Gunsol* [economic building], June 1956, p.120-121.

while the number of rich and upper middle farm households who were against cooperativisation was on decrease. The ongoing trend of voluntary cooperativisation movement from below might also boost the confidence of the authorities about the cooperativisation led by administrative organisations. In particular, most opposition leaders in the party began to be purged or demoted from key positions concerning the responsibilities of the war defeat: hence there could be no significant political voices against the government's decision.[90]

Of various possible reasons, however, the most fundamental was the post-war agricultural resource shortages. The Korean War devastated agricultural resources. Apart from 442,000 metric tons of grain losses, 905 reservoirs and irrigation facilities were destroyed, 370,000 chungbo of paddy fields were damaged and 90,000 chungbo of arable lands were demolished.[91] As 250,000 cows and 380,000 pigs were destroyed, animal powers and organic fertilisers were in great shortages. And the loss of 90,000 fruit trees reduced lucrative sericulture production by more than 30 percent. To rehabilitate agriculture therefore a large scale of investment was necessary; and the investment had to be financed within agriculture because industry had suffered much more severe damages during the war. Indeed, due to the heavy wartime industrial losses, the share of industry and agriculture in gross social product changed from 47 vs. 53 in 1949 up to 38 vs. 62 in 1953.[92] The problem was that small-scale owner farming scattered rural resources among farm households and thus could not afford such a large investment. In this sense agricultural cooperativisation was the only alternative to mobilise rural resources for the post-war agricultural rehabilitation.

The resource shortages also made small-scale owner farming unsustainable after the war. It was primarily because of the increasing severity of labour shortages in agriculture. During the war the DPRK population fell from 9.6 million in 1949 to 8.5 million in 1953 by 11.6 percent, and this decline was predominantly made in

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[90] Right after the war the mainstream party leaders made a series of political attacks against the opposition party leaders, which eventually led to so-called "August fraction incidents" in 1956 in which most pro-Soviet and pro-Chinese communist leaders were purged (Lee Jong Suk, Kim Il Sung's anti-fraction struggle and the formation of North Korean political structure [in Korean], *Yeoksa Bypyeong* [History Critique], 1995, p.187-251). Concerning agricultural cooperativisation, the party mainstream began to directly control agricultural policies as early as March 1954 when Park Mun Kyu, the minister of agriculture, was demoted to the vice minister and instead Kim Il, the close colleague of Kim Il Sung, was appointed as the new minister.

[91] Korean Central News Agency, *Chosun Joongang Nyungam 1954-55*, 1955, p. 51

[92] Kim Il Sung University Press (1965), p.192-193

agriculture. Peasant population declined from 6.6 million in 1949 to 5.6 million in 1953 by 1 million, which amounted to 92 percent of total wartime population decline. Not surprisingly agriculture suffered serious labour shortages during the war. And the shortages much worsened after the war: between 1953 and 1960 peasant population further declined to 4.8 million by more than 14 percent, owing to both devastated rural conditions and the post-war industrialisation derive.[93]

Table 4-2. Peasant and Non-Peasant Population During and After the Korean War

A: Composition (%)

	1949	1953	1954	1956	1957	1958	1960
Total	100	100	100	100	100	100	100
Peasant	69.3	66.4	61.3	56.6	53.1	49.8	44.4
Non-peasant	30.7	33.6	38.7	43.4	46.9	50.2	55.6

B: Number (thousand)

	1949	1953	1954	1956	1957	1958	1959	1960
Total	9622	8491	n.a	9359	n.a	n.a	10392	10789
Peasant	6668	5638	n.a	5297	n.a	n.a	n.a	4790
Non-peasant	2954	2853	n.a	4062	n.a	n.a	n.a	5999

* Peasant includes cooperative farmers, state farmers and private farmers
* The numbers of peasant and non-peasant population in [B] are calculated using their shares of total population in [A]

Source) *Chosun Joongang Nyungam*, various years

The problem was that small-scale owner farming could not be sustained under such a large extent of labour shortages. As discussed in chapter 3, the 1946 land reform permitted the peasant land ownership only to the extent that the owner could cultivate the land with his own family labours. The land must be returned to state when the owner's family became incapable of cultivating it. And the transfer of land

[93] *Chosun Jonsa* Vol.28 p. 24-27

ownership among farm households was strictly controlled by the authorities. It means that under severe labour shortages the land would be either idled or returned to state, making small-scale owner farming system collapse. Indeed, a basic reason for many poor farm households to form cooperatives during the war was that the cooperatives provided them with the only legal chance to preserve their private land ownership. In this respect small-scale owner farming was not unsustainable after the war: hence agricultural collectivisation was inevitable.

4.2.2. Agricultural Cooperativisation

Agricultural cooperativisation was carried out via three stages: experiment stage (August 1953-November 1954); mass movement stage (November 1954-December 1956); and completion stage (January 1957-January 1959).[94]

Experiment stage

The cooperativisation was launched on 9 August 1953 when the Sixth Party Central Committee Meeting ordered the government to "widely organise 'cooperative agricultural production joint firms' on the basis of preserving private land and private production means, and experimentally operate them from 1954".[95]

According to this order the cooperativisation proceeded on the voluntary basis. The purpose of the cooperativisation was to boost the post-war agricultural production by encouraging poor farm households who had difficulties in carrying on independent farming to form cooperatives, rather than to replace private farming with cooperative farming. Not only the authorities refrained coercive methods from the cooperativisation process but also allowed farm households to freely choose various organisational types of cooperatives: type I (mutual aid team), type II (semi-socialist cooperative) and type III (socialist cooperative). It was also up to farm households' decisions how to operate their cooperatives.

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[94] For the detailed discussion of the process, see Suk Lee, Agricultural Collectivisation and its implications in the DPRK, unpublished working paper-October 2002, University of Warwick

[95] The Central Committee of the Korean Workers' Party, on the Party's struggles and tasks for the post-war rehabilitation of people's economy concerning the conclusion of armistice treaty, 9 August 1953, in Gyuljongjip [Decisions], p.17.

Table 4-3. Three Organisational Forms of Cooperatives

	Type I (mutual aid)	Type II (semi-socialist)	Type III (socialist)
Ownership	. private ownership	private ownership: land and private plots private or communal ownership: draft animals and farm implements	Private ownership: private plots communal ownership: all other assets including land
Farming pattern	private + collective farming 1) the land owner decides what and how to produce in his land, 2) on the basis of the land owners' decision, farm households carries out production collectively	collective farming cooperatives decide what and how to produce in each land	Collective farming .cooperatives decide what and how to produce in each land
Output distribution	Products belong to land owners *the owners pay for the use of labour, draft animals and farm implements of other members in the form of products and or labour.	Products belong to cooperatives 1) cooperative distributes up to 20 percent of the crop to land owners, and the remaining 80 percent to the members according to their labour contribution 2) cooperative pays for the use of draft animals and farm implements under private ownership according to previously contracted charges	The products belong to cooperative Cooperative distributes all the crop to the members solely according to their labour contribution

In this stage state economic supports were the main policy to induce farm households to from cooperatives. In 1954, for example, the government supplied to newly registered cooperatives more than 7000 chungbo of land at free of charge, 80 million won of financial loans, and tens of thousand urban labour supporters.

Due to the voluntary principle however the cooperativisation ratio remained low. By October 1954 cooperative farms had incorporated only 10.9 percent of total farm households and 10.7 percent of total arable land. The size of cooperatives was also small, 10-15 farm households per cooperative on average.

Table 4-4. Cooperativisation Ratio: 1953-1958

	No. of cooperatives	No. of farm households in cooperatives	Arable land of cooperatives (1000 chungbo)	Cooperativisation ratio in total farm households	Cooperativisation ratio in total arable land
1953	806	11897	11	1.2	0.6
1954	10098	332662	576	31.8	30.9
1955	12132	511523	885	49.0	48.6
1956	15825	864837	1397	80.9	77.9
1957	16032	1025606	1684	95.6	93.8
1958	13309	1055015	1791	100.0	100.0

Source) *Chosun Joongang Nyungam*, 1959, p.193 & 330

Mass movement stage

Agricultural cooperativisation entered a new stage in November 1954 when the Party Central Committee announced the decision of "on the policies of our Party for future development in agriculture", ordering: 1) to form 'agricultural cooperativisation guidance committee' in Ministry of Agriculture and local governments so that administrative organisations directly organised and controlled cooperativisation process; 2) to increase the size of cooperatives up to 70 farm households per cooperative; 3) to train and dispatch administrative staff and agricultural specialists to operate cooperatives; 4) to make state agricultural plans for cooperatives from 1956.

The decision caused the immediate changes in the purpose, method and pattern of cooperativisation. Unlike in experiment stage the purpose of

cooperativisation in this stage was to replace small-scale owner farming with cooperative farming: hence it directly aimed at middle and rich farm households as well as poor farm households. Although joining cooperatives still remained non-compulsory, the voluntary principle in early stage was de facto abolished. Those who refused to join cooperatives faced the immediate cessation of state economic supports, including financial and grain loans, draught animals, chemical fertilisers, farm implements and other agricultural requisites. In many cases they could not access to communal production facilities such as reservoirs, milling stations and farm implements repair stations etc. Those who remained outside cooperatives even after these measures were taken had to face fierce class struggles initiated by local party organisations.

There were also two basic changes in the pattern of cooperativisation. First, the establishment of new type I and II cooperatives was discouraged and existing type I, II and III cooperatives were encouraged to merge into new type III cooperative with greater scales. As a result, the share of type III had increased to 97.5 percent of total cooperatives by December 1995, while that of type II had fallen to 2.5 percent and type I cooperatives had completely disappeared.[96] Second, the authorities took over the cooperatives from the hands of farm households. According to the November 1954 party order compulsory production and delivery quotas began to be imposed on cooperatives from 1956. And all the key positions of cooperatives began to be directly appointed by the authorities from April 1957.[97]

Due to the intensified state initiative the speed of cooperativisation accelerated rapidly. Only for a month after the mass movement stage started the number of cooperatives increased almost three times, and the cooperativisation ratio rose up to 31.8 percent in total farm households and 30.9 percent in total arable land. This fast speed continued until the end of 1956 when cooperatives absorbed 81 percent of total farm households, effectively ending the cooperativisation.

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[96] Kim Sung Bo (2001), p. 311

Completion stage

This stage concerned two tasks. First, all the remaining rich farm households were forcefully cooperativised between January 1957 and August 1958. Second, all existing cooperatives merged into a giant socialist cooperative established in every village between October and December 1958. The new giant cooperatives were announced not only to consolidate the work of such hitherto independent organisations as rural stores operated by consumer association and agricultural credit association under the control of village people's committee, but also to absorb all other social organisations, including health facilities and schools, in village. In particular, as the chairman of cooperative held the chairman of village people's committee, both politics and economy were consolidated in village. Due to the amalgamation the number of cooperatives declined from 13,309 in 1958 to 3,843 in 1959. But their average size increased from 80 to 300 farm households; and from 130 to 500 *chungbo* of arable land.

Finishing all the procedures, the authorities held the First National Conference of Agricultural Cooperatives on 5 January 1959 and formally announced that agricultural cooperativisation was completed in the DPRK.

4.2.3. Basic Features of the DPRK Cooperativisation

It is well known that many socialist countries experienced severe agricultural stagnation and corresponding social calamities during their collectivisation periods. The 1929-31 Soviet famine and the 1959-61 Chinese famine were two typical cases. In this respect, however, the DPRK cooperativisation was quite successful. There was no significant decline in agricultural production during its cooperativisation period. On the contrary, as presented by table 4-5, grain production grew fast particularly after 1955 when cooperative farming incorporated a half of total farm households. There were other agricultural developments, too. Between 1953 and 1958 sown areas increased by more than 30 percent and, of them, irrigated areas almost doubled up.

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[97] *Chosun Jonsa* Vol.29 p. 62-63

The number of tractors increased four times and chemical fertiliser two times. Although the number of animals had declined in the early stages of cooperativisation, the trend was turned upward since 1956. On top of them, no bloodshed or major famines were reported. Although the year of 1954 saw a serious food crisis, as discussed in next section, the overall food situation was steadily improving, as evidenced by the gradual increase in per capita food availability.

Why did then the DPRK not face such agricultural disturbances as other socialist countries did? It is difficult and perhaps unwise to give conclusive answers to this question, given little available data in this period. Nonetheless, some basic characteristics of the DPRK cooperativisation are still worth of noting.

First, the cooperativisation started from the agriculture ruined by the Korean War. Because production had already fallen drastically and the country's rehabilitation efforts continued throughout the cooperativisation, production was more likely to increase rather than fall.

Table 4-5. Agricultural Development During Cooperativisation

	1953	1954	1955	1956	1957	1958	1959	1960
Grain Production (1000 MT)	2327	2230	2340	2873	3201	3700		3803
Per capita food availability (kg)*	274			307				352
No. of tractor (15 hp)	764	800		2561	2554	2671		12500
Irrigated area (1949=100)	145			230				510
Use of chemical fertiliser per chungbo (kg)	131**			113				160

* per capita food availability = grain production/total population ** 1949 figure

Source) *Chosun Joongang Nyungam*

Second, the authorities took gradual and careful steps toward the completion of cooperativisation. Unlike the land reform that ended in a month, agricultural cooperativisation took almost six years to complete. It was also not the case that the cooperativisation involved all farm households from the beginning. The authorities first focused on poor farm households that had most positive attitudes to cooperative farming, and then gradually expanded the targets to middle and rich farm households.

Third, during the cooperativisation farm households were allowed to exit cooperatives at their free will. It is true that, as the cooperativisation drive intensified, more coercive methods were applied to force farm households into cooperatives. Nonetheless, the exit right was well respected and actually exercised until the very end of cooperativisation.[98]

Fourth, private land ownership was respected during the cooperativisation. There were two principles concerning the cooperativisation of farm households' private assets. In case of farm implements, animal and other assets except land, cooperatives paid the market prices. In case of land, however, they did not pay the price. Instead, the owners preserved their private land ownership even while the land

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[98] In August 1954, a year after the pilot cooperativisation program was launched, Ministry of Agriculture announced standard charter of agricultural cooperative. Apart from clarifying the organisational structures of cooperatives, the charter proclaimed two important rights of the cooperative members: 1) the members could join and leave cooperatives at their free will; 2) the members could preserve their private land ownership even after joining cooperatives (Sunjin Nongup, the Explanation of the Standard Charter of Agricultural Cooperatives (3) [in Korean], June 1955, p. 115).

Of course, both rights were effectively abolished when the authorities made new standard charter in November 1958, announcing:

> Article 5. Cooperative collectively owns all lands and crops subject to it.....
> .....
> Article 10-4. The members could exit cooperative. But those existing cooperative can not be allocated collectively owned production means and communal properties..... (Standard Charter of Agricultural Cooperative, 24 November 1958)

Since the new charter abolished the private land ownership in cooperatives, it also effectively prevented the members from exiting the cooperatives.

Until the new charter was announced, however, both the exit rights and private ownership of the cooperative members were well respected. For instance, There was so-called "Baechun Baram [wind]" between the autumn 1956 and the spring 1957. In Baechun county, South Hwanghae, most farm households left cooperatives as soon as the 1956 output distribution was completed. For this incident Ko Bong Gi, the chairman of South Hwanghae province party committee, was purged and the central Party launched a massive scale of investigation, which revealed that those who initiated the exiting from cooperatives were rich and upper middle farm households, and that they had just temporarily joined the cooperatives to avoid both high taxes on private farming and the pressure of local authorities. Although there are no records available to show how the authorities treated those farm

was collectively cultivated in cooperatives. And the land was returned to the owners when they left cooperatives. This private land ownership was well maintained until the November 1958 Standard Charter of Agricultural Cooperative announced that all the land in cooperatives must be collectively owned. [see footnote 98]

Fifth, farm households had a large extent of independence in forming and operating cooperatives. They freely chose the organisational forms of their cooperatives, elected the chairman and other staff, and selected other members among applicants and carried out production and marketing with little state control. The authorities of course eventually took over cooperatives. But they did it gradually through number of steps, which finally finished in April 1957. Thus cooperatives operated independently for somewhat long periods after the cooperativisation drive was first launched in August 1953.

4.2.4. The Structure of Cooperative Farm

The basic structure of cooperative has had little changes since the cooperativisation was completed in 1959. In the late 1980s, for instance, an average cooperative had around 300 farm households, 500 chungbo of land and 6-7 tractors per 100 chungbo, predominantly engaging in grain production.[99] It was almost same to the late 1950s.

Organisational Structure

Agricultural cooperative has two official purposes: executing state agricultural plans and improving their members' living conditions.

> Article 3. Cooperative focuses on agricultural production according to state people's economic plan, rationally organises side-works, correctly manages commodity circulation, credits, education, culture and health programs, and improves members' living conditions by continuously developing its economy[100]

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households, this incident suggests at least that the exit right in cooperatives was actually exercised until the very end of cooperativisation. (Suh Dong Man, 1995, p. 417-420)

[99] Oh Dae Ho (1989), p.41-43

[100] Standard Charter of Agricultural Cooperative, 24 November 1958

To realise the purposes the cooperative is organised as follows. The highest decision-making organ is General Assembly, a meeting of all members, or Representative Convention called into regular session at least once a quarter either on the initiative of Management Committee or on the request of more than one third of total members.[101] General Assembly notifies the orders of the country's leader, Kim Jong Il, to the members, enacts and amends all decrees and regulations governing the cooperative, ratifies annual production plan submitted by Management Committee, approves output distribution and so forth. Of the various functions of General Assembly, the most important is to select Management and Inspection Committees, the two key administrative bodies of the cooperative.

Management Committee, consisting of 9-25 members serving for a term of one year, is in charge of the daily operations of the cooperative and so responsible for its performance. In principle, the chairman of Management Committee who automatically holds the chairman of village people's committee is elected by the free vote of the members. In practice, however, he/she has been appointed by the communist party since the Party Central Committee ordered in April 1957 that the chairman must be from so-called core classes such as the families of the dead in the Korean War or of the party members, and that county and province people's committees must review the backgrounds of those elected by the cooperative members before they gave approval.[102] The chairman has one chief technician and two vice-chairmen. It was the responsibility of chief technician to make production plan, allocate works among work teams and sub-work teams, monitor their performance and provide technical supports. In contrast, the vice-chairmen are in charge of handling all the properties of cooperative, including social properties such as nurseries and clinics, and providing adequate funds and materials for production.

The chief technician supervises various work-teams [*jakupban*]. Usually a work team is formed in a natural hamlet, comprising 7-80 farm households. According to geographical conditions, however, 2-3 work-teams could be established in a hamlet in flat areas while 2-3 hamlets could form only one work-team in mountainous areas. There are many different work-teams by functions: grain (agricultural) production, vegetable production, sericulture, animal rearing, fishery,

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[101] Oh Dae Ho (1989) p.29-40

machinery, housing work-teams etc. Of them, grain production work teams have the greatest importance and the largest scale, comprising from 100-120 chungbo of land in flat areas to 40-60 chungbo in mountainous areas.

Actual production is carried out by sub-teams [*bunjo*]. A sub-team consists of 15-20 farm households in flat areas, 12-18 in intermediate areas and 8-12 in mountainous areas. Every sub-team is allocated its own land as well as farm implements and animals, being solely responsible for the production of its land. In this reason each sub-team constitutes the basic unit for output distribution.

Production, Marketing and Side-works

The most important task of the cooperative is to increase grain production. Indeed the authorities give all the cooperatives different ranks according to their grain production, differentiating the number of staff of Management Committees and the amounts of state resource supplies. And it is prohibited for farm households to grow grain privately in their private plots. Of its grain production, as discussed in the next section, the cooperative is responsible for selling all the remaining grains to state after deducting its assigned grain requirements that are determined by the authorities.

The cooperative should meet other agricultural production and procurement targets as well. Of its products, industrial crops are procured in their whole amounts by state procurement agencies. By contrast, other products such as vegetables and fruits could be freely sold to state enterprises and consumers after fulfilling state delivery quotas.

In case of vegetables, farm households could produce them privately in their private plots.

> Article 6. In principle cooperative produces vegetables jointly in communal land, but for some occasions cooperative could give each farm household private plot with the maximum of 30-50 pyung from its collectively owned land.
>
> Article 7. .... Member farm households could own small amounts of farm implements and facilities in order to handle their private plots.....[103]

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[102] *Chosun Jonsa* Vol.29 p. 62-63

Although the production from private plots is in principle for farm households' own consumption, it is allowed to sell them freely in farmers' markets.

Income Distribution

Income distribution is made by a somewhat complicate work-point system.

The net income of the cooperative is derived by subtracting various deductions from total outputs, including: 1) the fees for using state resources such as farm machinery, tractors and irrigation; 2) production fund for seed, fodder and fertiliser etc; 3) communal accumulation fund for machinery purchase and social and cultural facility constructions etc; 4) social and cultural fund for the maintenance of nurseries, libraries, and other facilities; 5) assistance fund for needy families.[104] It is the remaining income, reportedly 30-50 percent of total outputs, after deducting all the above payments that is available for the distribution among the member households.

To distribute the income the cooperative assesses each member's performance in the following ways. Above all, all farm works are grouped into six types according to their physical difficulties and demanding skills. Each type has a different work point. And the members earn their working days [*nodong il*] on the basis of their performance in production: [105]

$$W = w_t(F/S)q$$

where W =working days, w_t = work point by type, F = work fulfilment, S = work standard, q= work quality. For instance, the weeding for maize production is a type V work that assigns 1.4 working points for the worker who weeds 100 *pyung* completely. Suppose however that a member weeds only 90 *pyung* of which 10 percent, that is, 9 *pyung* have still some remained weeds. Then this member's working days for his weeding is:

$$1.134 = 1.4 \times (90/100) \times (0.9)$$

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[103] Standard Charter of Agricultural Cooperatives, 24 November 1958
[104] Yoon Ki Joong (1977), p.66
[105] Oh Dae Ho (1989), p. 104

The final income share of a member at the end of the year is in principle determined by the share of his cumulative working days earned relative to the grand total working days of all members of the cooperative for the year. But two problems would appear if this principle were directly applied to income distribution. First, the members would attempt to earn more working days rather than improve their productivity for the increase of final products. Second, some members having more favourable conditions such as more fertile land would earn working days more easily. To resolve the problems the cooperative imposes all work-teams and sub-teams concrete production quotas according to working conditions, exercising two bonus systems: work-team bonus system [*jakupban udaeje*] and sub-team group contract system [*bunjo dogupje*].[106]

Under the work-team bonus system the actual output in excess of 90 percent of production quota is directly awarded to the work-team. At the same time, if a work team falls short of 90 percent of production quota, it must contribute 5 to 15 percent of the deficiency to the cooperative. Using this system income distribution is first made among work-teams. That is, around 10 percent of income is distributed according to each work team's performance in compared with its production quota. And the remaining 90 percent is distributed according to the share of the cumulative working days earned by each work-team to the grand working days earned by all work-teams.

In work team the income is redistributed among individual members using the sub-team group contract system. Under this system the working days earned by each sub-team are corrected upward or downward, depending on whether it over- or under-fulfilled its production quota. On the basis of those adjusted working days the income is distributed among sub-teams. And then finally each sub-team divides its income among individual members according to the share of their working days.

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[106] For the explanation of work-team bonus system and sub-team group contract system in English, see Chung (1974), p. 26-29

4.3. The 1954-55 Food Crisis, State Grain Marketing, Food Rationing and Supplement Food Supply Channels

In 1957-59 the DPRK authorities reformed agricultural marketing and food rationing institutions. The purpose of the reform was to solve state grain collection problem permanently. To do this state grain marketing institutions were established to collect all rural grain surpluses. In return, food rationing expanded farm households and various supplement food supply channels were institutionalised. These three institutions have been still put in place, featuring the DPRK food distribution and consumption.

4.3.1. The 1954-55 Food Crisis and State Grain Collection Problem

In 1954 the DPRK authorities faced a similar grain collection problem to that in 1945-46. Until this time state grain collection was predominantly dependent on agricultural tax-in-kind that claimed 25 percent of harvest. During the Korean War however the authorities had to make several tax concessions and exemptions in order to help poor and lower middle farm households that suffered serious production losses.[107] After the war another concessions and exemptions were necessary to encourage farm households to join newly formed cooperatives. In consequence, the tax rate declined to 20.1 percent of harvest at the end of 1953. In contrast, urban food demand increased rapidly after the war. Due to the post-war population movement into cities the population of Pyongyang increased by 60 percent for less than a year between January and December 1953.[108] And the ongoing industrialisation drive pushed up the share of industrial labourers from 19 percent of total population in 1949 to 21.2 percent in 1953 [see table 3-9 in chapter 3].

To make the matter worse, the autumn harvest of 1954 was extremely poor. Grain production fell below the wartime (1950-53) level, recording the lowest since

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[107] Cabinet decree no.40, on providing peasants in calamities with food to secure their farming activities, 13 March 1952; cabinet decree no.114, on a partial exemption in agricultural tax-in-kind for the 1952 early crops, 20 June 1952; cabinet decree no.161, on exemptions in the 1952 agricultural tax-in-kind and state grain loans for poor peasants in food shortages, 30 September 1952.

1948 [see table 4-1]. It was therefore increasingly difficult for the government to meet urban food demand only by agricultural tax-in-kind.

In this circumstance the authorities launched a compulsory grain collection campaign between November 1954 and February 1955 that was quite similar to the 1945-46 campaign. On 15 October 1954 the operation of grain merchants was prohibited and individual grain trade was effectively banned.[109] And on 3rd November 1954 the Party Central Committee criticised the poor performance of the 1954 NKCA grain procurement, ordering the government to make new grain procurement plans and find all possible procurement sources.[110]

According to this order, compulsory grain delivery quotas were imposed on farm households until the end of November; and harsh grain collection procedures followed. Local cadres searched all villages to find unreported grain and, if caught, confiscated it without compensation. Those who did not co-operate with grain deliveries were threatened and beaten.

> The government agents, according to Chang, operated from a temporary headquarters with three rooms. In the first room, the initial negotiations took place. Armed with production reports, agents opened discussions on how much grains the farmer held, and how much he should sell to the government, urging that the farmer sell a maximum amount.....If the farmer resisted the demands of agent, he was taken to the second room. Here, more pressure was applied, with tougher language being used. If he remained adamant, he was moved to a third room where naked force was used. "Are you or are you not going to sell the government this amount of grain?" was the sole question asked, and if the answer remained negative the farmer had cold water poured on him, was beaten, and was subjected to other mistreatment. [111]

Not surprisingly this campaign caused severe rural food shortages in the winter of 1954-55. Indeed, many defectors stated that there occurred a small-scale famine. A defector recalled:

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[108] *Chosun Jonsa*, Vol.28, p. 50
[109] Cabinet decree no.130, on prohibiting individual grain merchants, 15 October 1954
[110] "On the prospect struggle measures of the Workers' Party for the rapid rehabilitation and development in agricultural economy", 3 November 1954, in the Korean Workers' Party Central Committee, *Gyuljongjip*-1954 [decrees-1954], p. 5-39
[111] Scalapino & Lee (1972), p.1060

> I saw many farmers who had been mobilised for construction work at the Hwangju Airfield collapse from hunger. The bark was peeled off from the pine trees for food as in the old days. The crisis was nation wide.[112]

There are no available official figures or literature either to confirm or to deny the existence of the famine. Nevertheless the defectors' statements seem quite real for two reasons. First, it was officially reported in 1954 that 40 percent of total farm households had great difficulties to feed themselves, 50 percent managed their livings with some difficulties and only 10 percent enjoyed some amounts of surpluses.[113] Given that 90 percent of farm households could not feed themselves properly, it would be odd that such a hash grain collection like in 1954-55 did not cause a food crisis in rural areas. Second, the authorities admitted increasing unrest among farm households. On 2 February 1955 the Party Central committee warned that the 1954-55 grain collection campaign was destabilising rural society too much even while state grain purchase remained moderate.[114] It blamed that local cadres ignored the supply of industrial goods for grain purchase, ordering the government to end the campaign by 10 February 1955. If there was no rural food crisis, this order should not be made.

According to the above party order, the compulsory grain collection was replaced with a voluntary procurement by NKCA in February 1955, which eventually ended on 24 June 1955 when the authorities re-allowed individual grain trade and lifted all the remaining grain delivery quotas from farm households.[115]

It is not clear how severe the 1954-55 food crisis was and how long it lasted. Nevertheless the existence of the crisis was enough to demonstrate a dilemma the DPRK authorities faced concerning state grain collection in the early 1950s. During this period, as the rate of agricultural tax-in kind continued to fall and the NKCA procurement remained minimal,[116] state grain purchase was increasingly necessary to meet growing urban food demand. Unlike the NKCA procurement, however, state collection was likely to cause much rural unrest because it imposed compulsory

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[112] Chong Sik Lee's interview with Kim Nam Sik, Yusong, August 28-29, 1969, in Scalapino & Lee (1972), p.1059
[113] *Kim Il Sung Jojakjip* Vol.5, p.113
[114] The Party Central Committee decision , on the assessment of grain procurement project and the measure to strengthen rural policies, 2 February 1955.
[115] Kim Sung Bo (2000) p. 354
[116] For the changes of the tax rate in this period, see table 3-6 in chapter 3

delivery quotas that did not take rural food consumption into consideration. The dilemma was that it was difficult to incorporate rural food consumption into state grain collection, even if the authorities intended to do, when agriculture consisted of a vast number of farm households carrying out consumption and production independently. It means that a similar food crisis could always happen whenever the authorities needed to impose compulsory delivery quotas on farm households.

4.3.2. The Institutional Solutions to State Grain Collection Problem

Between November 1957 and January 1959 the authorities found the institutional solutions to the above dilemma. Three solutions came out under the assumption that cooperative farms constituted the only grain producers in agriculture. First, state agencies purchased all surplus grains from cooperative farms. Second, food rationing expanded to cooperative farms in order to ensure a certain level of food consumption for farm households. Third, apart from state food rations, both urban and rural population were given additional opportunities to increase their food consumption.

4.3.2.1. State Grain Marketing

Institutional changes began by establishing new state grain marketing institutions. In contrast to the previous agricultural marketing institutions such as agricultural tax-in-kind, the NKCA procurement and markets, the new institutions had three distinctive features. First, they aimed to collect all surplus grains from producers while the previous institutions left considerable amounts of surpluses to producers. Second, private grain trade was strictly prohibited. Third, the powers and responsibilities of grain purchase were transferred from NKCA to professional state procurement agencies under the directives of local people's committees.

State grain marketing started on 3 November 1957 when the authorities announced a cabinet decree of food trade:

> The DPRK cabinet makes the following decisions about carrying out food sales under a unified state system.

1) Grain procurement from peasants and food sales to residents are carried out only by a unified state system
2) Agricultural cooperatives and peasants sell surplus grain only to state; and prohibit all individual merchant activities on grain from 1 December 1957.....[117]

The decree laid the foundation for the government to control all grain circulation in the economy. Indeed, private grain trade was prohibited and thus the government appeared as the only grain trader. It was however still difficult for two reasons for the government to collect all rural surplus grains. First, there were no administrative organisations dealing with state grain purchase. Second, although grain producers should sell their surpluses only to state, it was still their rights to decide how much to sell and even whether or not to sell.

To resolve the difficulties the authorities first launched a local administrative reform on 18 October 1958, establishing professional state procurement agencies in agriculture.

1) The procurement tasks that were carried out by rural consumption cooperative networks and Consumer Association in villages and labour districts are transferred to each province people's committee from 30 November this year.[118]

According to the reform, Procurement Division (and Section) was newly formed in province (and county) people's committee, being in charge of planning, supervising and monitoring grain purchases.[119] And Province (and County) Procurement Station was established as professional state procurement agency under the directives of province (and county) people's committee. It was responsible for collecting grains from cooperative farms, according to provincial plan, and delivering them to local food administration stations that rationed food among urban residents.

Because the reform assigned each province people's committee for the final responsibility of state grain purchase, grain collection was planned and organised at provincial level. Nevertheless it was necessary to co-ordinate provincial food balances at central level. For this purpose Ministry of Food Administration was expanded into

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[117] Cabinet decree no.102, on carrying out food sales under a unified state system, 3 November 1957
[118] Cabinet decree no.128, on partially reorganising guidance, commodity supply and procurement system in rural commerce, 18 October 1958
[119] Kim Chun Sung (1989), p. 98-114

Ministry of Procurement and Food Administration (MPFA) that controlled and co-ordinated both provincial grain collections and inter-provincial food trade. And Central Procurement Station was established under the directive of MPFA, carrying out grain deliveries among provinces.

Then the authorities announced 'the sale of all surplus grain to state' as a legal obligation of cooperative farms, finally completing state grain marketing institutions. The November 1958 Standard Charter of Agricultural Cooperative read:

> article 25. Cooperative should obligatorily carry out state procurement tasks by selling to state all surplus grain, including 'communal fond (fund)' that is financed in kind, ...[120]

The charter empowered the government to define the amount of surplus grain in cooperative farm by announcing that it should operate according to state economic plan (article 3), and that its chairman who was under control of county people's committee was solely responsible for the sales of agricultural products (article 20). On this basis, state procurement agencies began to collect all rural grain surpluses from the 1958 autumn harvest.

Specifically, state collection absorbed the surpluses by two channels: obligatory procurement [*euimu sumae*] and free procurement [*jayu sumae*].[121] Obligatory procurement referred to the legally imposed delivery quotas. The quotas were imposed on both cooperative farms and local procurement agencies. They were usually set as a certain percentage of production quotas; and cooperative farms should meet them, regardless of their actual grain production. By contrast, free procurement was employed to adjust the difference between the grain allocation and standard food ration of each farm household in cooperative farms. Unlike obligatory procurement the procurement targets were imposed only on local procurement agencies, not on cooperative farms. Hence, both cooperative farms and farm households had no legal obligation to fulfil them. Nonetheless, cooperative farms forced farm households to sell state agencies the differences between their grain allocations and standard food rations. It was therefore practically impossible for farm households to keep more grains than their food rations officially determined by the authorities.

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[120] Standard Charter of Agricultural Cooperative, 24 November 1958
[121] Yoon Ki Joong (1977), p.70-72; Shin Dong Sik (1993) p.36-37

As state grain marketing institutions were settled down, the previous marketing institutions were gradually dismantled. Of total 3700 cooperative farms, 1331 had been exempted from agricultural tax-in-kind by 1963 and another 1,772 farms by 1965. And the tax was finally abolished in April 1966.[122] Before that, the NKCA procurement had already ended in 1958. Due to the prohibition of private grain trade existing agricultural markets were either closed or merged into the only remaining farmers' markets. Even the operations of farmers' markets were increasingly limited to circulating minimal amounts of non-grain foodstuffs coming from small private plots of farm households.

4.3.2.2. State Food Rationing for the Whole Population

In parallel with the introduction of state grain marketing, there were two important changes in state food rationing. First, state food rations were supplied to all urban population. Second, a similar rationing mechanism was established for farm households. As the result, state food rationing began to cover the whole population from November 1958.

In the 1940s, as discussed in chapter 3, state food rationing was applied only to urban socialist sector. In 1952, however, urban industrial cooperatives and private firms licensed by the government were officially included in state food rationing.[123] And urban industrial collectivisation was completed in August 1958, making all urban population entitled to state food rations.[124] In consequence, the number of official rationing population increased rapidly. It amounted to 29.7 percent of total population in 1953, in compared with 18.6 percent in 1946; and the figure rose up to 38 percent in 1959.

However what differentiated the state food rationing of the 1950s most was not the increase in official rationing population, but the fact that rural population was in effect included in the rationing. In 1954 the authorities allowed some cooperative farms to provide food rations to their members in order to promote agricultural cooperativisation. And this practice had been applied to all cooperative farms by

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[122] Supreme People's Assembly, On abolishing agricultural tax-in-kind completely, 29 April 1966
[123] For details, see section 3.3, chapter 3

November 1958 when state grain marketing commenced. The purpose of this policy was to protect minimal rural food consumption and so prevent the occurrence of another food crisis even while the government procured all rural grain surpluses.

It did not mean that farm households were entitled to state food rations as urban population. On the contrary, the authorities have emphasised until present time that every cooperative farm should be self-sufficient on food. Nonetheless, it seems fair to say for three reasons that farm households were effectively incorporated into state food rationing in the late 1950s.

First, standard grain allocation was defined for every farm household in cooperative farm. And the allocation was based on state food rationing norms. For instance, Kim Il Sung wrote:

> Some says that leaving a peasant with 400 kg of *algok* [grain] for food is too much. This is a false view. Converting 400 kg of *algok* into rice gives around 320kg and dividing it by 365 days yields 800 grams per day. How could peasants do physically demanding farming works without eating 800 grams of rice per day.[125]

When the above remark was made in the mid 1960s, state food ration for (heavy) industrial worker was 800 grams per day. It means that the authorities allowed farm households to keep the same amounts of foodgrains as their counterparts in industry received from state rationing institutions.[126] A number of defectors who had been engaged in farming activities in the DPRK also stated that they received roughly the same amounts of grains as industrial workers.[127]

Second, farm households were entitled to their standard grain allocations. Income distribution in cooperative farms, as described in section 4.2.4, was determined according to each member's contribution to production. Hence some households might receive less grains than their standard allocations. However, even when it was the case, they could secure their standard grain allocations by two channels. Those who received less grains for temporal reasons such as illness were entitled to grain loans from their farms, the maximum of which was 30 percent of

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[124] For the cooperativisation in private manufacture and merchant sector, see The Korean Workers' Party Publisher (1960)
[125] *Kim Il Sung Jojakjip* Vol. 20, p.14
[126] See table 3-8 in Chapter 3. The 1952 food rationing norm had not changed until 1973.

actual allocations.[128] And those who suffered low income due to permanent reasons, including the losses of family members during the Korean War, were provided food aid by their farms.[129]

Third, the authorities allowed cooperative farms to keep necessary grains to provide standard grain allocations to their member households. Indeed, available DPRK literature suggests that state grain collections were carried out in a way to ensure that cooperative farms had the assigned amounts of grains to feed their members. For instance, a cabinet decree dated 20 July 1961 read:

> article 1. This rule honours cities, counties and agricultural cooperatives that *left enough grain for members, seeds, fodder and then sold* to state more grain, meat, vegetables, and other agricultural products....[130] [italics added]

A DPRK source made a similar report:

> The primary task of taking care of farm members' livings was to make them free of worries in eating, wearing and consuming problems. To do this the farms *made the farm members keep enough rice from algok [grain] they produced and then sell the remains to state.* And for other secondary foodstuffs farm members were in principle encouraged to use private plots effectively...[131] [italics added]

And the cooperative farms in Najin-Sunbong special economic zone distributed their grain production in the 1990s in the following orders:

1) payments and communal fund
2) distribution among farm members according to their works
3) state procurement of production in excess of the target
4) state procurement of farm members' allocations in excess of standard rations

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[127] Scalapino & Lee (1972), p.1056-1058
[128] Article 48 of Standard Charter of Agricultural Cooperatives, 24 November 1958
[129] Article 47 of Standard Charter of Agricultural Cooperatives, 24 November 1958
[130] Cabinet decree no 116, Rules on giving honours to cities, counties and agricultural cooperatives that sold more agricultural products to state, 20 July 1961
[131] Oh Dae Ho (1989), p. 109-110

5) patriot rice (10 percent of final allocations to farm members), pigs supporting people's army (70 kg of grains per households)[132]

In this reason the DPRK leaders frequently complained that, even if it was necessary to increase urban food supply, farm households were not interested in increasing food production more than what they needed for their own consumption. For instance, Kim IL Sung wrote:

> But now some peasants did not work hard, having egoistic thought that it is enough to produce what they eat. If peasants produce only rice that they eat, what should labour eat and how could he make cloths, machinery and fertiliser?.....[133]

The above three facts suggest that farm households were effectively included in state food rationing. But they also show that the rationing mechanism for farm households was different from that for urban population.

Until that time (and even until present time) urban population was biweekly provided state food rations by administrative organisations.[134] The rationing proceeded by provinces, with locally available food sources, under the responsibility of the chairman of province people's committee. But the central government set up a nationally unified rationing norm, planning and co-ordinating inter-provincial food trade to equalise state food rations among provinces.

To compare, farm households received food rations from their cooperative farms, not from administrative organisations. The government was not responsible for providing food rations to farm households, but instead it allowed cooperative farms to keep necessary grains to provide the rations. Food rations for farm households were basically equivalent to those for their counterparts in industry. Unlike urban population however farm households received their annual rations at once shortly after harvest was completed.

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[132] Ryu Tae Young (1998), p.83
[133] *Kim Il Sung Jojakjip* Vol. 28, p.189
[134] For details, see section 4.2 of Chapter 3

4.3.2.3. Institutions for Supplementing Food Rations

Owing to the introduction of state grain marketing and the expansion of state food rationing, the government could control the distribution and consumption of foodgrain up to household level. Yet it caused a burden that the government should provide appropriate food rations to the whole population even while the country's grain production was small and volatile.

To reduce the burden the government took three measures between the early 1950s and the early 1960s. First, it institutionalised the practice that both farm and non-farm households privately grew other food items than grain, including vegetables, fruits and meats etc, either for their own consumption or for markets. Second, cooperative farms were allowed to freely sell their food products except grain to final consumers after meeting state delivery targets. Third, state enterprises shared the responsibility to provide their employees with all necessary foodstuffs except grain.

Initially the above measures appeared during the Korean War when urban food rations were severely deteriorated. On 21 February 1952, for example, the government announced a cabinet decree to allocate agricultural land to state institutions under interior ministry and education ministry, allowing them to conduct farming activities to compensate insufficient food rations.[135] And five days later another similar decree was announced for universities and colleges across the country.[136] Although the decrees were temporal until the end of the war, the practice for non-farm households to involve farming activities did not stop since. On the contrary, the practice was institutionalised for all state enterprises in December 1961 when the new industrial management system called Daean Work System was established.[137]

Daean Work System referred to the collective management principle of the DPRK state enterprises in which the factory party committee exercises the traditional roles of manager. An interesting point was that it imposed on state enterprises the responsibility to supply all necessary foodstuffs to their employees, creating the position of second vice-chairman who was solely responsible for this task. It caused

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[135] Cabinet decree no.24, on the resolutions for land required to farms of subordinate organisations under interior ministry and education ministry, 21 February 1952
[136] Cabinet decree no.52, on running farms by universities and colleges, 26 February 1952

two important changes in the pattern of urban food supply. First, almost all state enterprises had their own food production facilities. Daean Electric Factory where the System was born, for example, was reported to have 70 *chungbo* of land for vegetable production, another 80 *chungbo* for fruit production, a chicken factory that produced 45,000 eggs per day, and a similar scale of pig factory in order to feed 5,000 employees. Second, state enterprises independently purchased agricultural products from cooperative farms unless the products were grains. Because the second chairman of state enterprise held the chairman of labour district management committee where the enterprise located, Daean Work System meant that the responsibility of urban food supply should be shared between the government and state enterprises.

Similar practices were institutionalised in cooperative farms as well. Above all, the marketing of other food items was carried out differently from that of grain. For these items there were three different purchasers: state procurement agencies, state enterprises and individual consumers. After fulfilling compulsory delivery quotas to state agencies, cooperative farms were allowed to sell their products to state enterprises under long-term supply contracts or to individual consumers in markets.[138]

And farm households were allowed to produce other foodstuffs privately, though private grain production was strictly prohibited. As pointed out already, they had private plots, a small number of animals, farm implements and additional grains for animal fodder under their private ownership. And the products from these assets were freely sold in farmers' markets.

In consequence, if excluding grain, there had emerged an agricultural system by the early 1960s in which virtually all the economic agents were engaged in food production and circulation.

4.4. New Agricultural Management System and Local Planning

Between 1959 and 1961 the DPRK authorities laid the foundations for the current planning institutions in agriculture. The institutions aimed to give local administrators real powers and responsibilities to control agriculture independently. Although their

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[137] Brun & Hersch (1977), p.357
[138] Kim Chun Sung (1989), p. 98-114

actual workings have changed since the early 1970s, their basic structures have remained unchanged to the present time.

4.4.1. Early Ministerial Planning in 1955-60

As already mentioned, agricultural planning that incorporated cooperative farms started in August 1955 according to the Party Central Committee decision of November 1954. The authorities imposed both production targets and delivery quotas on cooperative farms, and it was officially announced by the November 1958 Standard Charter of Agricultural Cooperative that cooperative farms should operate according to state economic plan.

By 1960 agricultural plans had been made, executed, and monitored by the existing ministerial hierarchy: Ministry of Agriculture (MOA) → Agricultural Division in province people's committee → Agricultural Section in county people's committee → cooperative farm in village.

It was MOA that had the final responsibility for agricultural planning. MOA involved the planning in three ways. First, it made draft plan for both current (annual) plan and prospective (3-7 year) plan, submitting it to SPC for transformation into control figures. Second, once draft plan was transformed into control figures, MOA made ministerial plan (resource allocation plan) that the local authorities and cooperative farms should follow in their actual operations. Third, MOA organised technical and administrative supports for the local authorities and cooperative farms, including: 1) agricultural research about new seed varieties, advanced technologies and new machinery etc; 2) the education and dispatch of agronomists and technicians to rural areas; 3) the making of standard forms and procedures in assessing, monitoring, and reporting agricultural performance through the administrative hierarchy.

The local authorities focused on delivering state plans to cooperative farms. The main responsibility of Agricultural Division in province people's committee was to divide state production targets by counties, allocate state resources owned by the province, and monitor the performance of counties. Agricultural Section in county people's committee had similar functions. It distributed the targets and resources

among villages (cooperatives), according to the size of land, labour force and productivity etc, and monitored their performance.

The local authorities were also responsible for supervising the operations of cooperative farms. For instance, Agricultural Section in county people's committees was responsible for guiding cooperative farms to make monthly or weekly working plans, supervising their labour and resource allocation plans, solving technical problems, introducing new seeds and technologies and organising the delivery processes of agricultural products to state. In practice, however, the local authorities were hardly engaged in the actual operations of cooperative farms due to the lack of experienced cadres. By 1960 a county people's committee had had only 2 personnel who dealt with agricultural planning, while there were around 15 villages in a county.[139] And most county people's committee did not have even a single agronomist/agricultural specialist.[140] It was therefore practically impossible for county people's committee to control the daily operations of cooperative farms.

In this reason agricultural production still proceeded without much intervention of administrative organisations. One might assume that village people's committee would control the daily operation of cooperative farm because its chairman was also the chairman of cooperative farm. But the farm operation were more influenced by elder members in village than by the chairman of village people's committee. The elder members had great knowledge about the traditional Korean farming methods that dominated agriculture at this time. Moreover, they were the heads of kinship families that divided village by hamlets. Given that collective farming was still in its early stage and the intervention of county administrators was limited, those elder members should effectively determine all farm operations.

But this ministerial planning had some basic problems. First, as the local authorities simply imposed production targets and made little efforts to control farm operations, it was common for both cooperative farms (villages) and work teams (hamlets) to try to reduce their targets rather than meet them.

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[139] Yoon Ki Joong (1977), p.24-25
[140] Kim Il Sung, For correct management of socialist agriculture, quoted in Chosun Jonsa Vol. 29, P. 194-5.

Secondly, the administrative structure of the local government acted as a bottleneck.[141] In county people's committee, for instance, Agricultural Section was in charge of agricultural planning while Labour Section controlled labour mobilisation from cooperative farms. Cultivating new land was the responsibility of Land Section; and resource supply to cooperative farms was under control of Social Section that managed county shops. Given these dispersed functions and responsibilities, it was difficult to execute agricultural plan efficiently.

Thirdly, there were confusions in the ownership and allocations of state agricultural resources.[142] By 1960 chemical fertilisers and agricultural chemicals were distributed by state procurement agencies that were under the directives of MOA. In contrast, machine tractor stations, reservoirs and waterways were owned by province people's committees. County people's committees also owned local farm implement factories and repair stations.

That state agricultural resources were owned by different administrative levels had not caused much trouble in small-scale owner farming where individual farm households made separate supply contracts with each resource owner. But the situation was different for cooperative farms that depended their input supplies solely on the owners' plans. Because most state assets were owned by MOA and provinces that did not know the situation in village, their resource allocations were less likely to meet the timings and amounts of needs in production. This scattered ownership also made it difficult for a single local authority, say, county people's committees to control cooperative farms in a unified way.

The above problems of the ministerial planning drew a particular attention from the DPRK as agricultural cooperativisation was completed in 1959. In his famous Chongsanri on-the-spot-guidance of January 1960, Kim Il Sung publicly criticised that, even though the central government was planning agriculture, cooperative farms operated without any concrete plans, ignored the plans and targets imposed upon them, wasted labour force and rural resources, and violated socialist distribution principles.[143] It was, he blamed, the consequence of bureaucratic and administrative

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[141] Yoon Ki Joong (1977), p.25
[142] Yu Gwan Chil (1974), p. 22-25
[143] *Kim Il Sung Jojakjip* Vol.14, p.98

ways of guidance in which the local authorities simply passed central orders to cooperative farms, not bothering to be involved in actual production.

According to his critique, the government launched an administrative reform in agriculture in March 1960.[144] All the cooperative-related-functions/sections in local people's committees were handed over/merged to Agricultural Division (and Section), which in turn went under the direct control of MOA. And many agronomists, agricultural technicians and staff who worked in MOA, together with the graduates from agricultural colleges, were dispatched to local people's committees and cooperative farms to improve their planning capabilities. Undoubtedly the reform intended to strengthen the existing MOA hierarchy. But it did not last long: the government soon changed its direction, launching another major administrative reform that dissolved the MOA hierarchy from the bottom.

4.4.2. The New Agricultural Management System and Local Planning

Between September 1959 and December 1961 the DPRK authorities conducted an important institutional experiment: to dissolve the ministerial system both in industry and agriculture and decentralise authority for controlling economy from the central bureaucracies in Pyongyang to local administrators. The main purpose of the experiment was to build up self-sufficient regional economies. The experiment proved a failure in industry when central ministries were revived in 1983.[145] In agriculture, however, the local planning institutions established in this time have still dominated the DPRK administrative structure.

4.4.2.1. Industrial Decentralisation Drive in 1958-60

After the Korean War the DPRK authorities faced two delicate issues concerning post-war economic rehabilitation. One concerned the priority of state investment: the war damaged all economic sectors while state resources for rehabilitation were limited. Another was that economic rehabilitation should be carried out in a way to prepare for the possible reoccurrence of war. During the war the DPRK industries,

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[144] *Chosun Jonsa* Vol.29, P.204

which had geographically concentrated on some industrial cities near natural resources, and its transportation facilities were easily exposed to the heavy US bombardment. To avoid the similar situation in the possible future war the relocation of industries had to be taken into consideration and ultimately regional economic self-sufficiency had to be pursued.

Both issues were eventually resolved as generating the following directions of post-war economic rehabilitation: 1) state investment focused on heavy industry, but the priority within heavy industry was given to those that had close links with light industry and agriculture, for instance, agricultural machinery production; 2) light industry developed exclusively on the basis of regional reserves and needs; 3) agriculture provided necessary resources and demands for the development of regional light industry, ultimately creating regionally self-sufficient economy.

According to these directions heavy industry developed first between 1953 and 1958. And it was soon followed by a massive-scale 'local light industry building campaign' between 1958 and 1960.[146] On 10 July 1958 the government issued a cabinet decree to establish within months more than a thousand local factories producing foodstuffs, daily necessities and farming implements.[147] Indeed, the number of local factories had soared up to around two thousands by the end of 1960, comprising 39 percent of total industrial production and 59 percent of consumer goods production.

It was these local factories that triggered the institutional reform in industry and agriculture between 1959 and 1961. In contrast to state enterprises in heavy industry, however, local factories in light industry had two distinctive features: 1) they were legally owned by the local governments, not by the central government; 2) as their operations were entirely dependent on local resources and demands, regional ties were more important than technical and functional ties. It was therefore unrealistic for central ministries to control their operations according to functional lines. But the problem was that existing local administrative organisations had neither experiences nor specified institutions to run those local factories.

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[145] Ko Seung Hyo (1993), p. 232, footnote 15.
[146] *Chosun Jonsa* vol.29. p.126
[147] Cabinet decree no.81, on improving and strengthening the production of daily goods and food stuffs, 10 July 1958

To resolve the problem the government launched an institutional reform in industry in August 1959.[148] The primary purpose of the reform was to establish professional state agencies in provinces and counties that could run local factories. But its consequences far exceeded establishing new agencies: it dissolved the existing ministerial hierarchies in industry and decentralised the powers and responsibilities to run the economy.

At central level, all industrial ministries merged into either Heavy Industry Commission or Light Industry Commission. Unlike the previous ministries both commissions did not involve the management of state enterprises, except those with national importance such as in defence industries. Their roles were confined to providing technical and administrative supports for provinces and co-ordinating provincial industrial plans. At province level, Province Economy Commission (PEC) was created, operating separately from province people's committee. It was formally the regional branch of Light Industry Commission but effectively functioned like a central ministry under the directives of the cabinet. It owned state enterprises in its jurisdiction, planning, managing, monitoring their operations and thus being responsible for their performance. At city and county level, City/County Economy Commission was established as a subordinate body of PEC. It delivered provincial plans to state enterprises, provided them with technical and administrative support and reported their performance to PEC.

4.4.2.2. The Establishment of the New Agricultural Management System

The institutional reform that started in industry soon spilled over to agriculture. On 15 December 1961 the Party Central Committee announced a decision of "on establishing new economic management system", ordering the government to dissolve the ministerial hierarchy in agriculture and establish new professional agricultural agencies in provinces and counties.[149] Like in industry new state agricultural agencies aimed to run cooperative farms. Unlike in industry, however, cooperative farms were legally owned by farm households, not by the government. Considering this

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[148] *Chosun Jonsa* vol.29. p.136-138
[149] *Chosun Jonsa*, vol.30. p.47-61

difference the authorities proclaimed three principles for state agricultural agencies to involve the operations of cooperative farms.

Combination of state ownership and cooperative ownership: Although cooperative farms were owned by farm households, the state should participate in their operation because it was the only supplier of agricultural inputs such as machinery, farming implements, water, fertiliser, agricultural chemicals, seeds, and animals etc. In particular, as agricultural production became more dependent on such inputs, it was necessary for the state to be the production partner of cooperative farms in order to improve their performance.

Enterprise methods of guidance: When the state was the production partner of cooperative farms, administrative guidance that the authorities simply imposed targets and assessed their performance was no longer effective. The purpose of state intervention was to improve productivity. To realise it, the state should be the organiser of farm operation. It should design production process, provide technical solutions to the problems in production, supervise the mobilisation of labour and other resources and organise output distribution and other farm activities.

Decentralisation of state guidance: To improve agricultural performance more power should be given to lower agricultural agencies that had closer relationship with actual production. It should be allowed for local agencies to make their own plans, reflecting their own conditions. It was also necessary for local agencies to directly control all state assets utilised for agricultural production.

On the basis of these principles, the government announced on 22 December 1961 a cabinet decree concerning so-called new agricultural management system in which local agencies planned and organised agriculture independently.[150]

At central level MOA was transformed into Agricultural Commission. In contrast to MOA, Agricultural Commission did not have any powers and functions relating to agricultural planning. Its main role was to organise agricultural research

and provide the cabinet with professional advice about the long-term perspectives of agriculture, as summarised in what follows.[151]

. Conducting and organising national research to develop agricultural technology
. Educating professional staff and organising scientific research for the long-term development of rural economy.
. Organising and guiding nationwide nature reconstruction projects
. Providing the cabinet with professional advice concerning the direction of long-term agricultural development

In consequence, Agricultural Commission was effectively excluded from agricultural planning and resource allocation.

Instead, all the planning-related-powers and functions that MOA had exercised were transferred to Province Rural Economy Commission (PREC), new state agricultural agency in province. PREC absorbed all agriculture-related-divisions, staff and functions of province people's committee, but operated separately from the latter. It directly belonged to the cabinet, acting like a central ministry. Of course PREC had to report to Agricultural Commission. However, as Agricultural Commission was not engaged in agricultural planning and resource allocation, there was no institutional channel for it to control PREC. In this respect PREC was a practical central planner in each province, as evidenced by its following roles.[152]

. Making agricultural plans and monitoring their executions
. Establishing the scientific and technological standards concerning agricultural production;

a) selecting standard seed varieties by crops; b) making rules for crop arrangements by land types; c) making rules for labour arrangements by land types and by crops; d) establishing the timing of all agricultural activities such as sowing, planting, and harvesting etc; e) choosing standard types of fertilisers by

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[150] Cabinet decree no.157, On establishing agricultural cooperatives management commission, 22 December 1961
[151] The Korean Workers' Party Publisher (1963), p. 94
[152] Park Young Keun (1992: p. 163-164); *Chosun Jonsa* vol.30, p.66-69; *Kim Il Sung Jojakjip* Vol.5 p. 442

land types and by crops; f) establishing the timing and methods of fertilising; g) making other provincial standards necessary for production.

. Establishing and running 'provincial resource supply company' that exclusively supplied agricultural inputs to counties and cooperatives

The most important organisation in the new agricultural management system was County Cooperative Management Commission (CCMC). Although it was established as a subordinate body of PREC, its roles far exceeded simply disaggregating provincial targets among cooperative farms. Rather, its basic responsibility was "to directly control and supervise all farm activities from making plans to organising production procedures, technological developments, input supplies, labour mobilisations and arrangements, financial activities and so forth".[153] Indeed, the functions of CCMC included:[154]

. Making county agricultural plans and transforming them into concrete production orders

. Providing cooperative farms with technical supports and all necessary state resources

. Supervising the labour mobilisations and arrangements of cooperative farms

. Supervising all other farm activities such as financial transactions, output distribution, bookkeeping and so forth.

In short, CCMC aimed to plan, organise and monitor all the operations of cooperative farms. To achieve this goal CCMC took over not only the cooperative farm-related functions from county people's committee, but also the ownership of all state enterprises and organisations providing goods and services to the farms, which had been previously controlled by province (and county) people's committee and MOA, including machine tractor stations, irrigation administration offices, farm implement shops etc.[155]

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[153] The Korean Workers' Party Publisher (1963), p. 39-40

[154] Park Young Keun etc (1992: p. 163-164); The Korean Workers' Party Publisher (1963), p. 95-109

[155] Cabinet decree no.157, On establishing agricultural cooperatives management commission, 22 December 1961

Actual functions of CCMC were carried out by three personnel. First, the chief technician under the chairman of CCMC was in charge of agricultural planning. He supervised all the production-related activities of cooperative farms, provided technical supports and introduced new technologies. Second, the first vice-chairman who controlled state enterprises and organisations in county was responsible for supplying state inputs to cooperative farms. Third, the second vice-chairman carried out labour administration in and among cooperative farms, supervised the consumption, marketing and financial activities of cooperative farms.

As CCMC directly organised their operation, cooperative farms lost their independence, being reduced to an agent of state agricultural plans. And there appeared the vertical relationships among the key personnel between CCMC and cooperative farms. For instance, the chief technician of cooperative farm should directly report to the chief technician of CCMC. And the primary responsibility of the former was to make and execute biweekly, weekly, daily operational plans according to the monthly production orders imposed by the latter. Similarly the two vice-chairmen of cooperative farm had to receive and handle the directives from their counterparts in CCMC.

An interesting point was that, since the chairman of cooperative farm was also the chairman of village people's committee, he should be subordinated to both CCMC and county people's committee. To prevent the confusions of these double directives the above cabinet decree of 22 December 1961 proclaimed that the chairman of cooperative farm should receive only the commands of CCMC and instead the chairman of village party committee should handle the directives of county people's committee.

4.4.2.3. Basic features of the new agricultural management system

The new agricultural management system brought immediate and profound changes to the levels, goals and methods of the authorities to control agriculture.

4.4.2.3.1. Local Agricultural Planning

Perhaps the most distinctive feature of the new system was that local (provincial) administrators planned and organised agriculture independently. Before the new system, state intervention in agriculture had been designed and exercised by MOA. And the role of local administrators was mainly to distribute central commands among producers. By contrast, the new system did not provide any institutional channel for Agricultural Commission to control local agricultural agencies. Each PREC made its own agricultural plan and functioned like a central ministry. The central co-ordination of provincial plans was also carried out by the cabinet, not by Agricultural Commission. It means that agricultural planning was now effectively localised.

It should be however noted that this localised planning did not necessarily weaken state intervention. Perhaps the opposite was true for two reasons. First, the localised planning enabled the authorities to directly control daily farm operations, which they had previously failed to. Second, it executed central commands more swiftly and efficiently in the sense that PREC was under the direct control of the cabinet, and that CCMC was effectively running cooperative farms. A DPRK source put these points as follows:[156]

> The natural and geographical conditions in our country..... make great differences within provinces, counties, cooperative farms and even lands in a farm. Thus there appear different regional characteristics in agricultural specialisation, production items, methods of cultivation and livestock rearing. Given these conditions it was impossible for MOA to provide technologies and production guidance appropriate to regions... Therefore it was the most rational and realistic policy to transfer production guidance functions of MOA to provinces.... Making guidance approach to production fields strengthens the unified central guidance rather than weakens it. Because PREC directly belongs to the cabinet, the party lines and policies spread into lower units more swiftly and correctly, and their execution is guaranteed with more responsibilities. Because the problems in production reach the centre more rapidly through the channels that provinces directly report to the cabinet, they are also resolved correctly.

[156] The Korean Workers' Party Publisher (1963), p. 91-95

4.4.2.3.2. Regional food self-sufficiency

The primary goal of the local planning was to achieve regional food self-sufficiency. As discussed in chapter 2 and 3, a basic reason for state intervention in agriculture in the DPRK was to resolve chronic food shortages and accomplish the country's food self-sufficiency. But, when agriculture was organised separately by provinces, it was difficult for the central government to pursue the goal in a unified way. The simplest and easiest solution to this problem was to impose food self-sufficiency on every region. Indeed the DPRK leaders believed that regional food self-sufficiency was the most powerful tool to resolve its chronic food shortages.

> Above all, our party has introduced an important principle of achieving food-self sufficiency in every region in the country in order to increase rice production and resolve grain problem. That every region in the country is self-sufficient on food means that we fully mobilise and utilise all the country's reserves for grain production. When every region is self-sufficient on food, the country's grain problem could be more easily resolved. It means that we provide people with abundant food, supply enough fodder to animals, resolve the shortages of raw materials in food industry and secure enough food reserves.... Therefore our party has made not only flat areas and intermediate areas but also even mountain areas, particularly the highland areas such as Ryanggang province, self-sufficient on food by growing potatoes and Bora beans fitting to their geographical conditions.[157]

On 7 August 1962, shortly after the establishment of the new agricultural management system, Kim Il Sung announced in Changsung Conference of Local Parties and Economy Workers that every county should pursue its own self-sufficient economy in order to boost the country's economy and develop rural and urban areas evenly.[158] The establishment of regionally self-sufficient rural economy was confirmed as a basic agricultural policy in February 1964 when Kim Il Sung declared so-called 'Rural Thesis' that clarified the purposes, prospects, structures and policies of the DPRK agriculture.[159] On 18 March 1964 Kim Jong Il, the present DPRK leader, also announced the establishment of regionally self-sufficient rural economies as one of the most important task in agriculture.[160]

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[157] Park Young Ho (1994), p. 224-225
[158] *Kim Il Sung Jojakjip* Vol.16 p.241-284
[159] *Kim Il Sung Jojakjip* Vol.18 p.195-245
[160] Kim Jong Il, (1985), p.3-27

Although the DPRK leaders stressed that regional self-sufficiency should be achieved at county level, it was in practice pursued only at provincial level. Even at provincial level it was still a complicated matter. At this time agricultural production was heavily affected by geographical conditions; flat areas such as South Pyongan, North and South Hwanghae provinces, produced mainly the country's main food grains such as rice, while mountainous areas, including Ryanggang, Jagang and North Hamgyung provinces, were largely engaged in the production of other minor foodgrains and industrial crops. Hence there were huge differences in provincial food balances, making most provinces in mountainous areas dependent on food imports from other provinces in flat areas.

To resolve this problem the authorities employed two important policies between the late 1950s and the early 1960s, which subsequently intensified in the 1970-80s.

The first and most important policy was that all provinces, including those in mountainous areas, should reorganise their agriculture in order to primarily produce two high-yield grain items: rice and maize. In flat areas it was greatly encouraged to expand paddy fields to grow rice. In intermediate areas maize began to replace existing crop items such as tubers, millets and potatoes, which had traditionally dominated the North Korean food diet. In mountainous areas existing crop composition was respected; but even in these areas maize was increasingly important in the 1970s when *Juche Nongbub* introduced new maize cultivation techniques. In the new agricultural management system PREC had the final responsibility to determine crop composition. Hence, although the increase of rice and maize production was a national policy, its implementation was solely imposed on local agricultural agencies.

Another important policy was to modernise agriculture. The DPRK authorities believed that in order to overcome natural and geographical handicaps agriculture should and could be transformed into an industry in which the productivity was determined by the levels of inputs and technologies, not by natural conditions.

> The industrialisation, modernisation...of agriculture means that, although agricultural production is biological process, its whole process is transformed into modern technological production process like industry that is realised by the powers of machines, electricity and chemicals.[161]

With this purpose the Party Central Committee adopted the first 7-year economic plan on 17 September 1961, announcing that the country should start its technical revolution in agriculture.[162] And four agricultural modernisation programs, including mechanisation, electrification, irrigation, and chemicalisation, were officially launched. A series of nationwide agricultural research projects and land reconstruction programs were also organised.[163] Although those agricultural modernisation programs were initiated by the central government, it was the task of local agricultural agencies to change actual agricultural production. PREC was responsible for developing and importing new technologies and transforming them into standardised agricultural production processes. And it was CCMC that organised actual farm operations according to provincial standards.

4.4.2.3.3. Production process planning (operational plan)

The new agricultural management system changed the basic character of agricultural planning. In ministerial system agricultural plans were basically target plans in which the authorities imposed production quotas but did not organise actual production procedures. These plans assumed that cooperative farms could operate with a large degree of independence. By contrast, the new system completely deprived cooperative farms of their independence from the selection of crops to the marketing of surplus products. Hence, unless the authorities made operational plans for cooperative farms, they could not operate properly any more.

Compared with target plans, operational plans had several distinctive features. First, they required far more detailed figures. In the ministerial system, for instance, it was enough to define production targets by crops and by cooperative farms. In the new system, however, the authorities should specify the targets not only by crops and by cooperative farms but also by seed varieties and by lands in order to make

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[161] Kim Seung Jun (1988), p. 295
[162] Control figures of 7-year (1961-1967) people's economic development plan, 17 September 1961

agricultural plans to work properly. Second, operational plans should incorporate production process plans. They should divide agricultural production by numerous different tasks and provide detailed figures by works, including the targets, timings, periods, input requirements, labour arrangements, applied technologies and the assessment criteria of performance etc. Thirdly, operational plans should include other activities of cooperative farms than production, including consumption, income distribution and financial activities etc.

4.5. Conclusion

In the DPRK agricultural history the years of 1953-61 (or 1953-73) constituted the most important period during which most current agricultural institutions were established, including: regional planning institutions, state grain marketing, state food rationing and supplement food supply channels. Concerning the establishment of these institutions this chapter has made the following points.

1. In the early 1950s the DPRK suffered the serious agricultural resource shortages caused by the Korean War. The shortages triggered early agricultural cooperativisation and made it successfully completed without production failures and any bloodshed. As cooperative farming appeared as the dominant farming style, the existing agricultural institutions based on small-scale owner farming became unsustainable. It was the basic reason why there were fundamental changes in agricultural institutions during this period.

2. Together with agricultural resource shortages, the DPRK faced a state grain collection problem in the early 1950s that caused the outbreak of unconfirmed small-scale famine in 1954-55. To resolve the problem the authorities addressed three institutional solutions: 1) the government collected all grain surpluses from cooperative farms in order to meet growing urban food demand; 2) instead, state food rationing expanded to cooperative farms and protected the minimal food consumption of farm households; 3) both farm and non-farm households were given additional

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[163] *Chosun Jonsa* Vol.30, p. 140-152

opportunities to increase their food consumption. The first solution was materialised as state grain marketing institutions in 1958-59. The second solution made state food rationing cover the whole population in 1954-58. And the third solution led to the post-war institutionalisation of the practices that all economic agents were engaged in farming activities during the Korean War.

3. Agricultural plans that incorporated cooperative farms were initially made by the centralised ministerial hierarchy. But they soon proved failed because local administrators could not control and organise daily farm operations. Moreover, the authorities attempted to reorganise the economy on the basis of regional self-sufficiency. In both reasons there appeared the new agricultural management system in 1961, decentralising agriculture. In terms of institutions the system meant the establishment of localised planning institutions in which province and county administrators controlled agriculture independently. The DPRK agricultural planning institutions consisting of Agricultural Commission, PREC and CCMC represented such localised planning institutions.

IV. The 1970-73 Food Shortage, Juche Nongbub And Central Planning: 1973-87

5.1. Introduction

The years of 1973-87 saw that the DPRK agriculture was highly centralised. Local administrators lost their independence in agricultural planning and resource allocation, being directly subordinate to the centre. Farm households also lost their influences in agricultural production as the central government established and forced mechanical farming procedures called *Juche Nongbub*. As the result, there appeared agricultural system in which the central government directly control even daily operations of cooperative farms using centralised administrative command hierarchies.

Of course, it does not necessarily mean that the new agricultural management system in the 1960s collapsed completely. In many important aspects the new agricultural management system was still well preserved. For instance, there was no change in existing administrative structure consisting of Agricultural Commission, PREC and CCMC. In particular, PREC and CCMC continued to have various nominal powers concerning agricultural planning and resource allocation. Nonetheless, the most fundamental feature of the new agricultural management system disappeared. That is, PREC and CCMC did not organise agricultural production independently any more, being strictly controlled by Agricultural Commission.

As those in 1940s and 1950s, the institutional changes in the 1970s were triggered and motivated by food shortage. Indeed the country faced another agricultural stagnation and corresponding food shortage in 1970 and 1973, which inspired the DPRK leadership to centralise agricultural institution. The purpose of this chapter is to examine how the 1970-73 food shortage eventually led to the establishment of centralised agriculture in the mid/late 1970s. For this, the remaining chapters are organised as follows.

In section 5.2 we identify the 1970-73 food shortage using a variety of anecdote evidence and discussed its institutional implications. Section 5.3 considers how this food shortage led to the introduction of *Juche Nongbub* in 1973. In this section we study in detail what *Juche Nongbub* is, how it was implemented, and how and why it resulted in agricultural centralisation in the 1970s. Section 5.4 studies the unified and detailed agricultural planning as the final stage of agricultural centralisation. Finally section 5.5 provides a brief summary of this chapter.

5.2. The 1970-73 Food Shortage and its Institutional Implication

5.2.1. The 1970-73 Food Shortage

It is not so easy to study the DPRK's food situation in the 1970s. During this period the DPRK government did not release any official agricultural statistics. No government decrees reflecting the country's food situation were published and, to our knowledge, no DPRK literature has studied the food situation in detail. Despite this lack of data, however, it is not so difficult to show at least that the country faced another food shortage from 1970 to 1973. There is a variety of anecdote evidence.

First of all, the DPRK leadership officially admitted that the country's grain production failed to catch up population growth in 1969-72. In his speech at South Hwanghae, Pyongyang, South Pyongan, and North Pyongan Agriculture Workers' Conference on 17 January 1973, " To make a great turning point in agricultural production", Kim Il Sung said:

> It was in 1968 that our country had the best harvest...But grain production did not increase fast from 1969.
>
> That grain production did not increase fast must be a serious problem. In our country, population has been recently growing by many hundreds of thousands every year. It is because due to our republic government's population policies birth rate is rising while death rate keeps on declining. When population grows, agricultural production must increase accordingly. But in our country the increase of agricultural production does not catch up the population growth.
>
> Because agricultural production did not grow fast for some recent years, the party central committee discussed a lot about agricultural problems and criticised much about rural economic

> workers. But the problems of agriculture sector have not been resolved and agricultural production has not had any progress.[164]

It is true that Kim Il Sung expressed his personal disappointment about the country's grain production for several times in the 1960s. But it was the first time that he publicly announced that the failure of grain production posed a serious problem to the country.

Second, consistent with this admittance, the authorities changed population policy and reduced state food rations between 1970 and 1973. By the 1960s the authorities had tended to encourage people to have as many children as possible so as to narrow the population gap between North and South Korea.[165] For instance, honours and economic merits had been given to the mothers who had more than 3 children. In the early 1970s, however, birth control policy such as state propaganda for the appropriate number of children and the provision of birth pills through state health organisations was first introduced. And this policy subsequently intensified, including: 1) increasing actual female marriage age to 22 (in law 19); 2) giving disadvantages in food rations to those who had more than 4 children; 3) intensifying state campaign for having only 3 children. In addition, the authorities reduced the food rations by 13 percent in 1973: every recipient was deducted four-days-rations from his/her monthly rations in order to accumulate so-called 'wartime grain reserve [*jonsi bichukmi*]' for the possible reoccurrence of the Korean War.[166] It was the first official reduction since 1952, and the reduced rations have not recovered until this time.

Third, the country's grain import drastically increased between 1970 and 1974. According to FAO statistics, the country's net grain import was 180 thousand MT on annual average in 1960-69. But the figure increased up to 421 thousand in 1972, and particularly it soared up to 1.1 million in 1973 and 772 thousand in 1974. Those figures suggest that the country's food situation in the early 1970s worsened enough for the authorities being responsible for providing state food rations to urgently increase grain import.

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[164] *Kim Il Sung Jojakjip* Vol.28, p. 10-11

[165] For the changes in the DPRK population policy by periods, see Jeong, Ki Won., Gang, Hyegyu and Lee, Sang Eun (1995)

[166] Naewae News Agency (1995), p.241 and Oh, Gyung Chan (1997), p.145

Table 5-1. The DPRK Grain Trade: 1969-75

(1000 MT)

		Avg. 60-69	69	70	71	72	73	74	75
Import	Total	236	226	338	300	531	1265	1108	621
	Maize	53					192	147	
	Wheat	180	226	315	300	320	480	520	300
	Other	91		23		211	593	441	321
Export	Total	56	114	99	113	110	152	336	528
	Maize	14	17	10	10	10	50	50	200
	Rice	70	96	89	103	100	102	286	328
Balance		-180	-112	-239	-187	-421	-1113	-772	-93

Source) FAO Statistical Database

Of course, the above evidence does not tell much about the precise timing and magnitude of the food shortage. Nonetheless, they seem enough to demonstrate at least that the country suffered poor harvests in 1969-72 and thus it faced another food shortages in 1970-73.

5.2.2. The Causation of the Shortage and Its Institutional Implications

As the timing and magnitude of the food shortage can not be ascertained, its causation is also not clear. Simply there are no enough data available for this issue. Nonetheless, it is still possible to point out some factors that might be attributed to the food shortage. For instance, the country's industrial development considerably decelerated in the late 1960s. According to official announcements, the DPRK industrial output grew by 35 percent on annual average in 1956-60. But the growth rate fell to 15 percent in 1961-65 and further dropped to 12 percent in 1966-70. It suggests a possibility that due to industrial slow down the government did not increase state resource supply to agriculture or even transferred agricultural resources to industry.

Table 5-2. Some Factors for the 1970-73 Food Shortage

A. Industrial Production Growth Rate (%)

	1956-60	1961-65	1966-70	1971-75
Annual average	34.96	15.02	11.86	20.00

Source) The ROK Ministry of Unification, *Bukhan Gyungje Tongyejip [Collected North Korean Economic Statistics]*. 1996

B. Temperature during Farming Season (Centigrade)

	60-68	69	70	71	72	73
Avg. (Mar.- Sep)	14.51	14.03	14.16	13.93	14.26	14.89

Source) *Chosun Joongang Nyungam*, Various years

C. Population Growth Rate (%)

	1953-56	1956-60	1960-65	1965-70
Annual average	3.29	3.61	2.83	3.33

Source) see Table 6-5 in chapter 6

Indeed a DPRK source pointed out that it was from 1973 that the government accelerated state investment in agriculture to increase the country's grain production, confirming this possibility.[167]

And there was an increasing military tension between the DPRK and the US. In January 1968 the US Navy ship Pueblo was attacked and captured by the DPRK forces, which triggered a severe military confrontation in Korean peninsular. Due to this confrontation many rural labourers were dispatched to the army, which might aggravate rural labour shortages.[168]

The weather was also bad. Between 1969 and 1972 the country frequently suffered abnormal cold weather during farming season, which might cause damages in grain production particularly in the northern parts of the country.

Finally, population growth considerably accelerated in the late 1960s: the annual population growth rate that had declined to 2.8 percent in 1960-65 rose up again to 3.3 percent in 1965-70. It means that the adverse impacts on grain production might be more easily turned into a real food shortage in the early 1970s.

An interesting point is that, whatever the real causation of the food shortage was, the DPRK leadership had a clear perception about it. Of the adverse factors mentioned above, the leadership admitted that the shortage of state agricultural

[167] Park, Young Ho (1994), p. 186

resource supply was important.[169] Indeed state policy to overcome the shortage mainly focused on increasing state investment in agriculture. From the mid 1970s, for instance, the government began to build small and medium size electricity station in every possible rural area, expand irrigation facilities to the dry-fields for maize production, mechanise all farming processes and establish land construction station in every county, launching a series of land expansion programs.[170] But the most important factor the DPRK leadership saw as causing the 1970-73 food shortage was not such socio-economic factors as above, but the institutional factors: the inefficiency and incapability of agricultural administrators and the deteriorating morale among farm households in cooperative farms.

> What was then the fundamental reason for failing agriculture for the last several years? Above all, it was because the party organisations failed ideological education for rural economic staff and agricultural workers.....The most important thing in the ideological education for rural economic staff and farmers is to sweep the remaining of capitalist ideology such as individual egoism, arm them with communist ideology, and particularly educate them to have the spirit to love labour....Not only rural economic staff but also ordinary farm members appeared to dislike labour. Now some farm members do not participate in farm operations as owners, avoiding hard works and seeing only easy works.[171]

> The next reason for failing agriculture for the last several years was the bureaucratism, subjectivism and formalism of rural staff in guiding rural economic sector....The main reason for North Pyongan to fail to increase grain production fast was to force rice variety that requires much fertiliser but ripens lately...Last year, because rural economic staff ignored the party policy and forced crops unfitted to natural and geographical conditions, some regions had even typhoon damages...In South Hwanghae the bureaucratism and subjectivism of rural staff led to caused unbearable incident that many thousand Chungbo of paddy fields were flooded. They stored too much unnecessary water in the bore and discharged it in monsoon season, making near paddy fields flooded....[172]

It is of course controversial whether the inefficiency of agricultural administrators and the low moral of farm households, both of which are seemingly the structural

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[168] *Kim Il Sung Jojakjip* Vol.28, p.11-12
[169] *Kim Il Sung Jojakjip* Vol.28, p.18-22
[170] Park, Young Ho (1994), p. 167-171
[171] *Kim Il Sung Jojakjip* Vol.28, p. 13-17
[172] *Kim Il Sung Jojakjip* Vol.28, p. 23-26

problems of socialist collective farming, were the real causation of the 1970-73 food shortage. But the point is that, on the basis of this assessment, the DPRK leadership made a series of institutional reforms in agriculture. Indeed, as we shall see below, all the important agricultural reforms in the 1970s had a common purpose to improve the actual workings of the existing agricultural institutions and so increase the country's grain production.

Then, what were the real contents of the reforms? Did they establish new incentive systems to make agricultural administrators and farm households operate more efficiently? Interestingly all the reforms in the 1970s had nothing to do with such incentive systems. On the contrary, the underlying idea of the reform was to minimise the independence of (local) agricultural administrators and farm households in resource allocation and production in order to prevent their errors and adverse influences on agricultural performance. Due to this idea the reforms proceeded in the way that the central government designed both detailed administrative decision making procedures and concrete farming practices, forcing them on local administrators and farm households.

Note that this idea was quite contradictory to the basic features of the existing agricultural institutions. Under the new agricultural management system established in the early 1960s, as discussed in chapter 4, province administrators (PRECs) independently conducted agricultural planning and resource allocation; and in order to implement provincial agricultural plans, county administrators (CCMCs) organised all the operations of cooperative farms. By contrast, central administrators (Agricultural Commission) had no institutional channels to influence agricultural planning and resource allocation.

An interesting point is that these decentralised agricultural administrative organisations did not change at all in the 1970s. Then, how did the central government dismantle the independence of local administrators? To answer the questions we have to look at two important institutions that appeared in the 1970s: *Juche Nongbub* and the unified and detailed agricultural planning.

5.3. Juche Nongbub and Central Control over Agriculture

5.3.1. The Content of *Juche Nongbub*

According to official view, *Juche Nongbub* is a set of new farming techniques that Kim Il Sung invented and spread to the whole nation throughout his on-the-spot-guidance in 1973-79.[173] And the DPRK government has propagandised that '*Juche Nongbub* is not only the scientific farming methods to conduct farming scientifically according to our country's climates and geography and crops' biological characteristics as well as intensive farming methods to enable highly intensive agriculture according to modern science technology".[174] As implied by this official view and propaganda, *Juche Nongbub* primarily concerns farming techniques. Indeed its development was motivated by two technical needs: 1) upgrading traditional Korean farming skills and importing advanced foreign technologies in order to prevent the adverse impacts of abnormally cold weather[175] that hit the country in the early 1970s; 2) establishing new farming practices for maize production that was increasingly important for the country's food balance but still unfamiliar with many farm households.[176] Nevertheless, the actual contents of *Juche Nongbub* did not confine to farming techniques, and particularly its implications were much more institutional than technical.

In general, *Juche Nongbub* consists of three parts: *youngnong wonchik* [farming principles], *youngnong bangbub* [farming methods] and *sebu gongjeong* [detailed production processes].[177] In the first place, its farming principles provide four basic rules for agricultural administrators and producers to follow in order to increase agricultural production under such unfavourable natural conditions as small land and cold weather. One rule is *jokji jokjak* [appropriate crops for appropriate land]: the selection of crops and their varieties should be strictly binding to regional geographical conditions. Another rule is *jokki jokjak* [appropriate farming for

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[173] Lim, Ki Bum (1992), p.211-213
[174] Kim, Il Nam., Kim, Se Kuk and Kim, Young Un, *Chosun Nongupsa [The Agricultural History of Korea: henceforth Chosun Nongupsa]* Vol.4 , 1991, p.116
[175] *Chosun Nongupsa* Vol.4 , p.113-115
[176] For the importance of maize production in the period, see table 6-6 and 6-7 in chapter 6

appropriate timing]: all farming activities should be carried out in the most effective timings and periods given variable seasonal weather conditions. The third rule is *pogi nongsa* [dense planting/cultivating]: in order to maximise agricultural production under limited land, it is necessary to increase the number of planted seeds per land. Indeed, as we shall see in chapter 6, the country began to increase the number of planted seeds per land from the mid 1970s at least by 30 percent more than before. And the final rule is *jiryuk hyansang* [improving land fertility]: when the repeated mono-culture of food grains is inevitable due to small land, systematic farming practices to prevent soil exhaustion must be put in place to improve agricultural productivity.

The farming methods of *Juche Nongbub* refer to techniques or farming practices to realise the above principles. With respect to *jokji jokjak*, for instance, *Juche Nongbub* specifies crop compositions and seed varieties by provinces, counties and even cooperative farms. In case of South Hwanghae province, a typical flat area in the country, rice and maize are the standard crops; and Pyongyang 15 is the standard variety of rice. In contrast, the standard crops of mountainous North Hamgyung include minor foodgrains such as beans and millets as well as industrial products. Its standard rice variety also is not Pyongyang 15 but Yeomju 1. Concerning *jokki jokjak*, *Juche Nongbub* provides standard flow charts of all farming activities from before-planting ploughing to harvesting. In typical rice production areas, for instance, ploughing should be completed by mid March, transplanting by late May, harvesting by early September and so forth. To carry out *pogi nongsa* efficiently, *Juche Nongbub* develops six farming techniques/practices: 1) new seedling techniques such as rice cold seedlings and humus–cake nurseries for maize seedlings; 2) the application of rice transplanting methods to maize production; 3) optimal arrangements of planted seeds in order to maximise sunshine penetration to plants; 4) new fertilising practices to fertilise differently roots, stems, and leaves by seasons; 5) new irrigation practices to keep the temperature of water supply constantly; 6) standard methods of usage of pesticides. *Juche Nongbub* also specifies the methods to prevent soil exhaustion, including the usage of organic fertiliser along with chemical fertiliser, regular soil changes and obligatory winter ploughing.

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[177] For official explanation about the contents of *Juche Nongbub*, see *Chosun Nongupsa* Vol.4 , p.117-

If *Juche Nongbub* refers simply to techniques, the above farming principles and methods would feature it best. However, *Juche Nongbub* is not only a set of techniques but also a set of real production procedures. In fact, it designs all detailed agricultural production processes, forcing them on farm households in the fields. A DPRK source put this as follows.

> An agricultural production process is divided into several detailed processes. Detailed processes consist of means of labour for works, working times and working places. Suppose that in order to produce fertilising-soil (fertilising-soil production process) a machine loads materials to tractors, tractors deliver them, decomposers decompose them and then tractors deliver them again and pile them at a place. In this case the work of the machine to load materials constitutes loading detailed process, that of decomposer decomposing detailed process, that of tractors delivery detailed process and piling detailed process.....
>
> Great *Juche Nongbub* not only specifies the kinds, flowcharts and conducting methods of production processes by agricultural items, but also concretely reveals the kinds, flowcharts and conducting methods of the detailed processes of each production process. *Juche Nongbub*...establishes new scientific systems of detailed processes. The detailed processes revealed by *Juche Nongbub* are all scientifically constructed ones to maximise the productivity in agricultural products and animals.[178]

Specifically, *Juche Nongbub* designs detailed production processes as follows. First, it specifies the concrete target of each detailed process. In case of ploughing, for instance, it defines how widely, deeply and evenly a labourer should plough in order to earn one labour-day. Second, it defines the concrete input requirements of each detailed process with possible substitution ratios among input factors. For instance, it specifies how many tractors and labourers should be mobilised to plough one hectare of dry-field as well as how many labourers can substitute one tractor for the work. Third, it specifies both the duration of each detailed process and the flowcharts of several detailed processes by production processes and agricultural items.

5.3.2. The Establishment of Central Control

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[178] Lee, Jin Gyu (1986) p. 82

At first glance, *Juche Nongbub* seems nothing special, arguably except its principle of *pogi nongsa* [dense planting]. All countries must have their own farming techniques fitted to their natural conditions. In particular, many important aspects of *Juche Nongbub* such as the farming principles of *jokji jokjak* [appropriate crops for appropriate land] and *jokki jokjak* [appropriate farming for appropriate timing] are too natural to be possibly disputable by anyone. In this reason many outside researchers have regarded it as irrelevant.[179] When we focus on the technical aspects of *Juche Nongbub*, this criticism might be plausible. However, when we look at its institutional implications, the situation is quite different.

The most important feature of *Juche Nongbub* is that it standardised all the agriculture-related-decisions and practices from crop selections by agricultural administrators to fertilising activities by farm households. It had two important institutional implications in the 1970s. First, because it was the central government that made, changed and interpreted *Juche Nongbub*, local administrators were effectively deprived of their existing powers to conduct agricultural planning and resource allocation independently. In other words, using *Juche Nongbub* the central government directly controlled local decision making processes without formally centralising the existing decentralised agricultural administrative organisations. Second, because all detailed production processes in agriculture were standardised and forced by the government, farm households also completely lost their autonomy/influences in production. There was now no difference between simple industrial labourers and farm households in production.

Consider the first implication in detail. Until the early 1970s the rights of crop selections had been exercised by province administrators, and Agricultural Commission had no power to influence provincial decisions. But this situation dramatically changed as *Juche Nongbub* was introduced. It started with Kim Il Sung's order in 1970-72 that Agricultural Commission should develop new rice and maize varieties fitted to cold weather.[180] To carry out his command Agricultural Commission had centralised all agriculture research institutes by 1973, on top of which was Maize Research Institute in Pyongyang. And there appeared new national standard seed varieties in 1974-75. To spread the new varieties Agricultural

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[179] For instance, see Sakurai, Hiroshi (1998)

Commission organised various province/county agriculture conferences, and particularly Kim Il Sung himself forced them on local authorities and farm households under the name *Juche Nongbub* during his on-the-spot-guidance. Not surprisingly there was resistance by province administrators. But it was immediately criticised for not abiding *jokji jokjak* [appropriate crops for appropriate land], the main principle of *Juche Nongbub*. And this criticism was initiated by Kim Il Sung himself. For instance, he attacked the regionalism of local agricultural administrators in his speech at the Korean Workers' Party South Hwanghae Conference on 12 September 1979 as follows:

> South Hwanghae also lost lots of grains due to the failure of rice variety selection....When I guided a conference in South Hwanghae last year, an official told me to plant "Baecheon 68" and "Yeonan 12" in the southern areas below Suyang Mountain. So I told him not to do that but to plant "Pyongyang 8". "Baecheon 68" and "Yeonan 12" are not good varieties. Because I experimented "Pyongyang 8" for a long time, I know it well.
>
> But some counties in South Hwanghae are still not willing to plant "Pyongyang 8". Bacheon county failed this year's production because of planting "Baecheon 68"... Yeonan county also planted "Yeonan 12" this year, failing to have bumper harvest.
>
> South Hwanghae sees regionalism in the selection of varieties. That Baecheon county planted "Baecheon 68" and Yeonan county "Yeonan 12" is the reflection of regionalism as well as the incident expressing that they do not have the sprit of accepting the party commands absolutely and unquestionably. When the party orders to plant "Pyongyang 8" and "Pyongyang 15", it must be done without any question....South Hwanghae Province Party Committee and Province Rural Economy Committee should be responsible for the fact that Baecheon county and Yeonan county planted "Baecheon 68" and Yeonan county, damaging grain production.[181]

Together with this personal interference of Kim Il Sung, the central government made a series of official decisions to effectively transfer the rights of crop selection from the hands of local administrators to the centre. On 7 January 1976, for instance, the government issued the cabinet decree no.70 to announce that the regional and provincial crop compositions of rice, maize and beans should be determined according to *Juche Nongbub*, which was followed by the similar Agricultural

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[180] *Chosun Nongupsa* Vol.4 , p.120-121
[181] *Kim Il Sung Jojakjip* Vol.34, p. 369-370

Commission order no.15 on 20 March 1978.[182] Since then the central government has directly controlled province, county and even village crop selections and their selections of seed varieties although province administrators are still nominally entitled to doing the job.

Juche Nongbub deprived province administrators of their powers to establish technical standards in farming activities, too. It was mainly due to the principle of *pogi nongsa* [dense planting]. In his speech at National Agriculture Conference on 15 January 1975, "All strengths to take over the height of 8 million MT of grain production", Kim Il Sung ordered to drastically increase the number of planted maize seeds up to 40 billion.[183] By that time however no provinces had had any experiences of this dense planting of maize. To carry out his order, therefore, all provinces had to accept new dense planting techniques, including standard seed arrangements, humus-cake nursery techniques and new methods of fertilising and irrigation, which were developed by Agricultural Commission through already centralised agriculture research institutes. Since then all technical standards in agriculture were made and forced by Agricultural Commission; and the roles of local administrators were reduced to simply passing the standards to producers.

Local administrators also faced the weakening of their powers in agricultural resource allocation. *Juche Nongbub* stated that the standard ratio between fertiliser consumption and agricultural output should be 1:10. It also specified the ratios between other inputs such as tractors and agricultural outputs, mechanically regulating local administrators' decisions on resource allocation. Furthermore, the central government centralised the resource allocation procedures in many cases. In the mid 1970s, for instance, the government established new centralised irrigation institutions in which the central irrigation manager in Agricultural Commission directly controlled province irrigation managers and their subordinates: regional, country and village irrigation managers.[184]

Through the above procedures local administrators had effectively lost their powers in agricultural planning and resource allocation by the 1979 when *Juche Nongbub* was finally announced as the only farming method in the DPRK.

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[182] *Chosun Nongupsa* Vol.4 , p.123
[183] *Kim Il Sung Jojakjip* Vol.30, p.30-31
[184] *Chosun Nongupsa* Vol.4 , p.133-134

What about the impacts of *Juche Nongbub* on farm households? As pointed out in chapter 4, farm households had already lost their autonomy in production as the new agricultural management system let local administrators effectively run cooperative farms in 1961. Until the early 1970s however farming practices had largely relied on traditional farming techniques that were not standardised and so varied greatly by regions. In this reason the morale of farm households, particularly that of elders who had good knowledge on traditional farming techniques, was still an important factor in agricultural production. But *Juche Nongbub* decisively weakened this importance.

In February 1973, a month after Kim Il Sung began his on-the-spot-guidance concerning *Juche Nongbub*, the DPRK government launched the three revolution team campaign in rural areas in which young communists were dispatched to cooperative farms to initiate the ideological, cultural and technological education of farm households.[185] It was this campaign, which continued throughout the 1970s, that made *Juche Nongbub* take root in actual production. The campaign began by establishing agriculture colleges educating *Juche Nongbub* in every province and opening the night curriculum of *Juche Nongbub* in all rural high schools and party institutions. Graduates from agriculture colleges were prohibited from moving to cities, being obligatory dispatched to cooperative farms; and all important staff of cooperative farms, including chairmen, team and sub-team leaders, should enrol the *Juche Nongbub* curriculum. In consequence, there was a shift in core generation in cooperative farms, playing down the influences of elders with the knowledge of traditional farming techniques. The next step of the campaign was to standardise all farming procedures according to *Juche Nongbub*. In 1977, for instance, each cooperative farm in South Hwanghae convened more than 100 *Juche Nongbub* conferences, reorganising its farming practices.[186] Because *Juche Nongbub* consists of standardised mechanical detailed production processes like those in industry, it means that the influences of individuals in agricultural production were minimised. Finally the campaign formalised the daily lives of farm households: so-called the life of 8 hours' learning and training, 8 hours' labour and 8 hours' rest appeared as the normal

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[185] For the three revolution team campaign, particularly its economic aspects, see chapter 8 of Park, Young Ho (1994)
[186] *Chosun Nongupsa* Vol.4 , p.164

life of an ordinary farm household. In consequence, the central government controlled every aspect of rural life, easily making *Juche Nongbub* as the only farming method in agriculture.

In sum, *Juche Nongbub* provided the channel through which the central government directly controlled both local administrators and farm households even while maintaining the existing decentralised agricultural administrative organisations. The below quotation from Kim Il Sung's speech on 15 January 1975, "all strengths to take over the height of 8 million MT of grain production", seems to show, though metaphorically, what changes *Juche Nongbub* brought about in agriculture.

> We firmly established political and ideological bases to increase agricultural production fast....Among our workers stands the revolutionary spirit to accept the part policies unconditionally and implement them unconditionally. In the past, when the party made new policies, the spirit to accept and carry out them was lacking. But recently we launched strong ideological struggles against the wrong tendency among workers to neglect or negotiate the party policies so that it has disappeared. Now the thoughts of the party centre immediately go down to the below and the thoughts of the below immediately reach the party centre... Today all our staff and party members know only the party lines and policies, do only as the party says to do, breathe only with the party ideology....Today our party and society are filled with Juche Idea. This is the decisive base on which we can take over the height of 8 million MT or even 10 million MT of grain production.[187]

5.4. The Unified and Detailed Planning and Its Implications

From the viewpoint of economic planning *Juche Nongbub* meant a huge input-output table in agriculture. Because it defines both standardised output targets and input factors for detailed production processes, economic planners had mechanical input-output relations in all agricultural production processes as in industrial production processes. On this basis, the DPRK government announced the unified and detailed planning in agriculture in 1979. To simply put, the unified and detailed planning

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[187] *Kim Il Sung Jojakjip* Vol.30, p.26-28

refers to the principle that the central planners should plan and control all concrete production processes through centralised planning organisations.[188]

Although the DPRK agricultural planning started in 1957, it had not planned concrete production processes until the 1970s. In his speech at Joint Conference of the Party Central Committee, Central People's Committee and the Cabinet on 10 January 1979, "On conducting detailed agricultural planning", Kim Il Sung pointed out:

> Listening to the chairman of Agricultural Commission concerning the 1979 agricultural plan, I can not say that detailed agricultural planning is successful. The manuscript of this year's agricultural plan include only big indicators such as sown areas by crops, the amount of fertiliser and the number of planted seeds per pyung, not revealing concrete technical indicators for labour plans and agricultural production processes. ... I think that the manuscript of this year's agricultural plan is only around 15% successful in terms of detailed planning....Now we do not have enough time for this year's agricultural plan, so provinces and counties should help find and add missing detailed factors by agricultural production processes to the manuscript.[189]

The unified and detailed planning intended to upgrade this low level of agricultural planning. What should be noted however is that this new planning principle brought about two immediate institutional changes.

First, the government established a formal organisation through which Agricultural Commission directly controlled their subordinates in provinces (PRECs), counties (CCMCs) and villages (cooperative farms) concerning agricultural planning and resource allocation.

> The state adopted the cabinet decree no.10 (26 February 1979), establishing Staff Department the head of which was the vice chairman of Agricultural Commission. Staff Department grasped and guided agriculture in a nationally unified way, ensuring appropriate input supply for production. Hence, all the production activities carried out by cooperative farms in the country proceeded thoroughly according to the commands from Staff Department in Agricultural Commission; and all the small and big problems in the production processes were immediately reported and informed. In consequence, it was possible to guide cooperative farms to conduct

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[188] For official explanation of the unified and detailed planning, see Park, Young Keun et al (1992), p. 204-221

[189] *Kim Il Sung Jojakjip* Vol.34, p.45

farming according to their geographical conditions under the principles of *jokji jokjak* and *jokki jokjak*.[190]

Second, agricultural planning and resource allocation went under the control of State Planning Commission (SPC), state planning agency in Pyongyang, too.

In the unified planning system the planning departments in production units that had been previously subordinated only to their higher organisations were also defined as the planning cells that were subordinated to state planning agency. Hence they played the roles of State Planning Commission's arms and legs.[191]

It was 1965 when SPC first established its own branches up to county level, providing technical supports for PRECs, CCMCs and cooperative farms. But local agricultural organisations had not received orders from SPC, and so its influences had been limited. However, as the unified and detailed agricultural planning started, local agricultural organisations formally received the planning orders from SPC; and SPC branches monitored and reported local agricultural planning.

Undoubtedly both changes completed the centralisation procedures in agriculture that stated with the introduction of *Juche Nongbub*. An interesting question is: how did the DPRK economic planners manage the unified and detailed planning in agriculture? In the early 1970 the planners reportedly struggled to deal with only 4,000 control figures. However, there were more than 3,000 cooperative farms in the country; and agricultural productions processes consists of numerous different production processes by seasons, crops, lands and so forth. Was it then really possible for the planners to conduct the unified and detailed planning?

It is not clear how detailed agricultural plans the DPRK planners have made. Nonetheless, a possible answer to the question might be found in two DPRK planning methods: the division of planning indicators and the pursuit of low equilibrium.[192] In the DPRK economic planning, there are various planning indicators. In agricultural plan, for instance, if one goods is produced and consumed exclusively within a cooperative farm, it constitutes the cooperative farm planning indicator. And if

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[190] *Chosun Nongupsa* Vol.4 , p.165
[191] Park, Young Keun et al (1992), p. 209

another goods is produced and consumed exclusively within a county, it is the county planning indicator. Similarly there exist the province planning indicators and the SPC planning indicators as well. The division of planning indicators means that each planning organisation is exclusively responsible for planning its own planning indicators. In each county, for instance, farm implements are produced by the factories owned by CCMC and consumed by cooperative farms within the territory of the county. Hence, each CCMC is solely responsible for planning the production, distribution and consumption of farm implements. In this respect each planning organisation has to deal with two different planning indicators: the one it can plan independently and the other higher planning organisations must plan and pass. The pursuit of low equilibrium refers to the principle that each planning organisation maximises the share of its own planning indicators in total planning indicators it has to deal with. In other words, it should be as self-sufficient in its operation as possible.

In this framework, as each planning organisation is more self-sufficient, the planning works of its higher organisations are simpler in the sense that the number of their planning indicators decline. In chapter 4 we have seen that the DPRK has pursued to establish self-sufficient rural economies up to county level since the early 1960s. It means that, although the country introduced the unified and detailed agricultural planning in the late 1970s, its planning burden to the planners might not be so huge as it looked.

Of course, as each planning organisation is more self-sufficient, the central control over agricultural planning might weaken. However, insofar as the central government provides standard agricultural production processes, say, *Juche Nongbub* on the base of which all planning organisations make their plans, this weakening of the central control might not be so great.

5.5. Conclusion

The findings of this chapter can be summarised as follows.

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[192] ibid., p.254-262

1. Between 1970 and 1972 the DPRK faced another food crisis. The food shortage seems to be caused by several factors, including decelerated industrial development, increasing military tension with the US and bad weather. But the DPRK leadership saw that the main causation of the shortage was the inefficiency of agricultural administrators and the low morale of farm households. It was why the leadership pursued the institutional changes in agriculture.

2. The underlying idea of the institutional changes was to minimise the independence of (local) agricultural administrators and farm households in resource allocation and agricultural production, preventing their errors and adverse influences on agricultural performance. Due to this idea the institutional changes in the 1970s largely meant the increasing central control on agriculture.

3. The changes began by the introduction of *Juche Nongbub*. It standardised all the agriculture-related-decisions and practices from crop selections by local agricultural administrators to fertilising activities by farm households. Using *Juche Nongbub*, on the one hand, the central government deprived local administrators of their powers to conduct agricultural planning and resource allocation independently. It also blocked any influences of individual farm households on agricultural production. In consequence, the DPRK agriculture was highly centralised in the 1970s although the existing decentralised administrative organisations did not change.

4. On the basis of *Juche Nongbub* the central government also announced the unified and detailed agricultural planning in 1979. To conduct the planning it established a formal institutional channel in which Agricultural Commission directly controlled local planning and resource allocation procedures. It finally completed the centralisation procedures in agriculture that stated with *Juche Nongbub* in 1973. It is this centralised agriculture that has played until present time.

VI. The 1987-99 Food Crisis and the Collapse of Agricultural Development Strategy

6.1. Introduction

So far we have seen that the DPRK agricultural institutions have evolved to resolve repeated food shortages and the final outcome of this evolution is the current institutions in which the central government plans and controls all economic activities concerning food production, distribution, consumption and trade. Ironically, however, the current institutions have seen the worst food crisis in the DPRK history. Indeed the country fell into another food shortages in 1987-93, reportedly faced famine situation in 1994-99 and has not overcome the food shortages yet. The remaining chapters of the thesis examine this recent food crisis and its implications for the future of the DPRK agriculture.

In the previous three chapters, we have identified three historical food shortages in the DPRK but have not discussed their patterns and features in detail. Rather, we have focused on how they triggered and influenced corresponding institutional changes. It is mainly due to the lack of available data. Fortunately, however, the data are not so rare, though not abundant either, concerning the recent food crisis. It is therefore feasible to study why and how the crisis happened, how it was unfolded, what features it had and how the agricultural institutions influenced the features. In this sense the 1987-99 food crisis gives a good, and the only so far, chance to understand the real contents of the DPRK food shortages.

Of more than ten years of the food crisis, we focus on the years of 1994-99 for several reasons. First, this period saw the most severe food shortages in the DPRK history in which the country reportedly faced a national famine. Second, all the debates over the food crisis have concentrated on this period. Third, the institutional changes caused by the food crisis were most dramatic during this period: hence it is of great importance concerning the future changes of the DPRK agriculture.

The purpose of this chapter is to provide some preliminary discussions in order to proceed into the 1994-99 DPRK food situation.

To do this we first review the food crisis from in its whole period from 1987 to 1999 in chronological order, showing that the country's food situation was most critical between 1994 and 1999. This chronology is presented in section 6.2. Then we study the reasons why the DPRK fell into another food shortages in the late 1980s and eventually faced famine situation in the mid/late 1990s. Section 6.3 concerns this issue. In this section we argue that the DPRK agricultural strategy for grain production has totally collapsed since 1987, which has caused a drastic decline in the production and food availability between 1987 and 1997. In section 6.4 we outline various controversial issues surrounding the food crisis with three simple questions: 1) did the food crisis escalate to famine; 2) was the famine different from those in other countries; 3) has and will the famine change the DPRK agriculture? And finally section 6.5 briefly summarises this chapter and presents some introductory remarks for next chapters.

6.2. The Chronicle of the Food Crisis

The recent food crisis in the DPRK was first widely known in the autumn of 1995 when the government appealed for international aid organisations to provide emergency food aid. A variety of evidence however suggests that the country was facing a precarious food situation for more than a decade. In this section we briefly describe the country's food situation from the official reduction of state food rations in 1987 to international disputes over the DPRK food refugees in 1999.

The years of 1987-93

The first sign of the crisis emerged in the late 1980s when PDS (public distribution system), the DPRK food rationing system, went under stress.

In 1987 the government reduced PDS rations, which had been maintained stable since 1973, by 10 percent.[193] The reduction was made shortly after the DPRK leadership expressed increasing difficulties to feed the population; and massive food imports immediately followed. According to FAO statistics, the DPRK (net) grain import almost tripled to 438 thousand MT in 1987 from 153 thousand MT in 1986 and since then the country has turned into a net grain importer.[194]

Table 6-1. The Changes of Food Rations

	Norm	* ration for official worker
1955-72	Basic Formula: from 900 grams of daily rations for heavy industrial workers to 300 grams for children	700 grams per day 256 kg per year
1973	Deduction of four days rations from monthly rations for so-called "war-time grain reserves" (average 13% deduction)	608 grams per day 222 kg per year
1987	10% deduction for so-called "patriotic grain"	547 grams per day 200 kg per year
1992	10% deduction from adult rations	492 grams per day 179 kg per year
1994-	Great difference between norm and actual ration supply	-

Source) Naewae News Agency (1995), p. 241 and Oh Gyung Chan (1997), p.145

Economic reforms were also launched to compensate for the reduction of food rations. In 1987 the government allowed industrial workers, who had been entirely dependent on PDS rations, to privately cultivate small lands near their work places and encouraged state firms to allocate official farming hours for their workers.[195] Farmers were permitted to expand their private plots collectively and personally. In

[193] Oh Gyung Chan (1997), p 145
[194] see section 8.5.2 and table 8-18 in chapter 8
[195] Naewae News Agency (1995), p. 230

addition, though still illegal, it was actually tolerated for farmers to grow grains in their private plots and trade them in farmers' markets.

Food shortages were unmistakable in the early 1990s. The government launched a "let's eat only two meals a day" campaign in 1991; and it subsequently intensified.[196] In 1992 PDS rations were further reduced by 10 percent except for army and heavy industrial workers.[197] In 1993 the government started diplomatic negotiations with South Asian countries, including Thailand and Vietnam, to obtain emergency food shipments although its grain imports already exceeded 1 million MT.[198] And it was persistently reported that PDS rations were delayed or temporarily stopped in northern parts of the country and there emerged, though unconfirmed, food riots.[199] In December 1993 the government officially admitted the failure of the 3rd 7-year plan and announced that it would adopt new economic policies to resolve the shortages of food and consumer goods under the slogan of "agriculture first, light industry first, foreign trade first".

The year of 1994

Food situation was reportedly critical in 1994. A Chinese source warned in 1994 that the DPRK was facing the worst food shortage in its history.[200] Indeed the government shut down PDS in four northern provinces –North and South Hamgyung, Ryanggang, Kangwon- and prohibited all internal food shipments to these provinces.[201] And an official grain re-collection campaign was launched to coercively collect 5 kg of grains per farmer who had already received his/her annual rations.[202] It was in this year that the DPRK food refugees began to flee to neighbouring countries, particularly China.[203] Until then, however, the government denied the existence of hunger in the country. In January 1994, for instance, the spokesman of the DPRK Agricultural Commission condemned the hunger reports of western media as "wicked deception to

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196 Noland, Robinson and Wang (2001), p.743
197 Oh Gyung Chan (1997), p 145
198 Radio Press, (Monthly) North Korean Policy Trend [in Japanese], No.12, 1993, p.36 [henceforth North Korean Policy Trend]
199 Kim Yeon Chul (1997) and The Economist, 18. Dec. 1993
200 Eberstadt (1997), p.233
201 Natsios (1999)
202 Ahn Jong Chul (1998), p. 251
203 KBSM(1998)

degrade the socialist image of the DPRK", arguing that it has filed a large amount of grain stocks as an important strategic resource".[204]

The year of 1995

This attitude however changed suddenly in early 1995. In February the government announced that it received 300,000 MT of food aid from an international NGO.[205] In May it officially admitted that the country was facing food shortage, asking its two old enemies, the ROK and Japan, for food assistance.[206] In June the country agreed with the ROK and Japan to procure emergency food aid –150,000 MT of gratis from the ROK, and 150,000 MT of gratis and another 150,000 MT on concessional terms from Japan. The aid was publicly announced to the DPRK people in July. And a similar appeal was also made to the USA in that month.

Together with its admittance of food shortages, the government implemented a wide range of pragmatic policies in early 1995.[207] At central level, all the construction projects under way were suspended and the resources mobilised for the projects were transferred to agriculture and light industry. At provincial level, local governments and state firms were empowered to import and trade food independently. At county level, all the regulations on farm households' private plots were effectively lifted. Profit-pursuing activities such as personal restaurants and foodstuff sales in farmers' markets were also tolerated. And Kim Jong Il declared in May that boosting grain production is "the most important task in the current socialist phase of the DPRK", ordering the government to mobilise all the possible resources to accomplish the task.[208]

To make the situation worse, however, the country faced a catastrophic flood between July and August that was officially the worst for the last hundred years. According to official estimates, flood damage reached 15 billion US dollars, including 1.2 million MT of grain losses that comprised roughly 17 percent of the 1994 production announce by Pyongyang Media. In August, immediately after the flood,

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[204] North Korean Policy Trend (1994, No.27), p.47
[205] North Korean Policy Trend (1995, No.4), p.52
[206] Noland, Robinson and Wang (1999)
[207] Joongang Daily News, 28 May 1995
[208] Yonhap News Agency, 23 June 1995

the government launched an official appeal for international food aid for its flood victims, which was soon followed by FAO and WFP's field-visits to the country. And both organisations announced a joint statement in December 1995 that 2.1 million DPRK children and 500,000 pregnant women were on the verge of starvation.[209] Following this announcement, the first international food aid, 140 tons of rice from WFP, was delivered to the DPRK in November 1995; and the aid rose up sharply since. It supplied around 2.2 million MT of food grains to the DPRK between 1995 to 1998, which accounted roughly for 14 percent of total food consumption of the country during that period.[210]

The year of 1996

The year of 1996 began with an official announcement that PDS would stop providing food rations until May and those who steal food and animals would be immediately executed.[211] The announcement was made shortly after the government reported the depletion of food stocks to WFP and FAO.[212] As food situation got worse, however, the government introduced in January a new incentive system for cooperative farms called 'new sub-team contract system'.[213] The new system allowed farmers to keep their surplus grains after fulfilling fixed state delivery quotas while the old system collected all their production except their food rations.

Despite the new incentive system, however, the 1996 autumn harvest was extremely poor. According to Pyongyang media announcement, grain production dropped to mere 2.5 million MT in 1996, the lowest level since 1948.

This poor harvest made two changes. First, the government began to admit that it should change its basic economic structure in order to survive. In December Kim Young Nam, the head of the DPRK Cabinet, said in an interview with a German TV that the country was facing the risk of economic collapse and the government would take all possible actions to avoid it.[214] Kim Jong Woo, the vice-chairman of the DPRK Foreign Economy Commission, made a similar statement that the country

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[209] FAO/WFP(22 Dec 1995)
[210] The ROK Ministry of Unification (17 Sep 1999)
[211] Yonhap News Agency, 3 Jan 1996
[212] FAO/WFP (22 Dec 1995)
[213] Joongang Daily News, 16 June 1996

failed to establish a self-sufficient economy, its utmost economic goal, and the government would change its economic policies to participate in international markets and revive its economy.[215] Second, a growing number of food refugees travelled domestically without official permission and even fled into China, raising great security concerns from the government. In December, for instance, Kim Jong Il warned that such a population movement was causing chaos and disorder in the country, ordering the government to take immediately all necessary actions to prevent it.[216]

Due to the refugees, however, international attention for the DPRK food situation was growing fast. They commonly stated that a large number of population was starving to death in the DPRK and even cannibalism took place in some areas.[217] Quoting their statements, international media began to report from mid 1996 that a famine hit the country in full scale.

The year of 1997

This famine claim became more widely spread in 1997 when the country's food situation was reportedly worst. In late 1997 some NGOs operating for the DPRK food refugees in China shocked the world by revealing their survey results that around 20 percent of the refugee family members died of starvation in 1995-1997.[218] On the basis of these survey results, they argued that the DPRK was experiencing one of the worst famines in human history that could destroy all the younger generations of the country without appropriate international intervention. Since then such high mortality figures have been frequently quoted by international media to characterise the DPRK food crisis.

But this famine claim was immediately denied by the DPRK government. Lee Jong Wha, the Chairman of the DPRK Flood Damage Rehabilitation Committee, criticised the claim as "pure fiction", saying that it would not accept any food aid with such political purposes as degrading the country's pride and demanding its economic

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[214] North Korean Policy Trend (1997:No.1), p.1
[215] North Korean Policy Trend (1996:No.6), p.56-7
[216] Natsios (1997)
[217] North Korean Policy Trend (1996, No.10), p.31; Kyodo News Agency, 24 Oct.1996; Yonhap News Agency, 4 July 1996

and political changes.[219] UN aid organisations and even some donor countries, including the ROK, were also sceptical about such high mortality figures.[220] In addition, some Russian sources said that, although the DPRK was suffering food shortages, the situation was far from being famine.[221]

In this circumstance WFP offered its first eyewitness account concerning the mal-nourishment of the DPRK children in April 1997, describing the country as being "on the knife edge of a major famine".[222] This eyewitness account was revised and confirmed by FAO/WFP/EU's research on the DPRK children's nutritional state in May 1998 (FAO/WFP/EU, May 1998). The research provided a surprising result that 60 percent of the DPRK children were stunted and 50 percent were malnourished.

Facing widespread hunger, the DPRK government took a wide range of agricultural reforms in 1997-99. The reforms started with purging Seo Gwan Whi, the party agricultural secretary, and the chairmen of PRECs in 6 provinces in January 1997,[223] which led to Kim Jong Il's direct control on agriculture and his new interpretation of *Juche Nongbub*. First, the government began to change the country's outdated crop husbandry. It encouraged potato production instead of maize which had dominated agriculture for the last four decades, imported double cropping system and new grain hybrids from abroad, rented lands to foreign farms, received UN Agricultural Developments and Recovery Funds and so forth. Second, (cooperative) farm management began to be deregulated. Farm households were allowed to keep a portion of their surpluses and given back their rights to elect the chairman of co-operative farms.[224] In some cases, they were given complete autonomy in farm management from choosing crop items to marketing the surpluses. Third, the government repeatedly announced its willingness to introduce market mechanism in agriculture. In May 1998, for instance, the vice-minister of the DPRK Agricultural

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[218] KBSM (1998); Reuters, 16 Sep.1997
[219] Gustavson and Lee Rudolf (1997), p.142
[220] Interacting DPRK Working Group (1999)
[221] A number of Russian delegates who visited the DPRK in late 1997 said that their impression was that, at least cities and towns, there was no famine. The food supply was very limited, there were cases of malnutrition; however most people had the minimum sufficient for survival. From these sources North Koreans got used to Spartan conditions that might seem intolerable, for example, Western observers. That is, the food situation could be described as very grave and the ruling regime was backed into a corner: for the DPRK, this was nothing new (The Centre for Contemporary International Problems, The DPRK Report No.9: September-October 1997, Nautilus Institute)
[222] WFP (18 April 1997)
[223] North Korean Policy Trend (1997, No.2), p.32

Commission stated that the country considered to introduce so-called Chinese style 'contract production system with farmers', plant export-oriented-crops, liberalise grain prices and gradually replace state food-rationing with market mechanism.[225]

The years of 1998-99

Reported food situation improved slightly in 1998 and 1999. In January 1999 the government announced that the 1998 grain production significantly increased from the lowest level in 1995-97 and the economy began to revive.[226] Both UN aid organisations and the ROK government also observed that PDS recovered its functioning in many areas and PDS rations were on increasing.[227] In particular, farm households now had reportedly far better food situation than before.

Nevertheless, the food crisis was far from being over. WFP was still appealing for emergency food aid of 1.2 million MT in 1998 and 1.1 million MT in 1999 to ease the country's dire food situation.

In 1998-99 another concerns were raised with respect to the DPRK food crisis. First, the DPRK food refugees in China provoked international disputes. While NGOs and the ROK government demanded China to accept their refugee status and provide appropriate supports, the Chinese government forcefully returned them to the DPRK when caught. Second, it became apparent that emergency food aid could not be the solution of the ongoing food shortages in this country: hence international concerns gradually shifted to its long-term agricultural recovery. Third, the DPRK became more open to outside world politically and economically. It has made new diplomatic relations with many European and Asian countries, trained its government officials to have more knowledge about international economy and encouraged foreign investments more than any time. And the government has revealed its willingness to negotiate any political and military issues with any countries if they could provide food and hard currencies. In this respect international concerns have been growing over how the food crisis will change this only remained isolated and aggressive communist country in Far East.

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[224] FAO/WFP (8 Nov.1999)
[225] Hwang Dong Un (1998)
[226] The ROK Ministry of Unification (8 Oct.1999)

6.3. The Collapse of Agricultural Development Strategy in 1987-1997

Fig.6-1 indicates what is the main factor leading to the recent food crisis in the DPRK. According to official announcements, grain production in the DPRK increased more than five times from 1.9 million MT in 1946 to 10 million MT in 1987.[228] But it stagnated visibly in 1988-93 and completely collapsed in the mid/late 1990s. In 1997, for instance, grain production declined to 2.5 million MT that was only one fourth of the 1987 level. FAO statistics provide a similar picture. They suggest that grain production had persistently increased from 3.6 million MT in 1961 to 9.1 million MT in 1993, but collapsed to 2.6 million MT in 1996. Given this drastic decline in grain production, it would be quite odd if the country did not face any food crisis in the 1990s.

Table 6-2 shows this point more clearly. During the private farming era in 1946-53 grain production increased on the annual rate of 2.95 percent while population declined on the rate of 1.23 percent due to the Korean War. Needless to say, grain production exceeded population growth. During the regional planning era in 1953-73 population grew rapidly on the annual rate of 3.03 percent. However, grain production also accelerated to the annual rate of 4.24 percent, still exceeding population growth. And this gap between grain production and population growth much widened during the central planning era under Juche Nongbub in 1973-87. But the situation was completely reversed in 1987-97. During this period grain production drastically fell on the annual rate of 12.32 percent while population still grew annually by 1 percent. It seems therefore hardly surprising to find that the country suffered significant food shortages in the 1990s (and the 1980s).

The question is: why the DPRK grain production steadily increased until the 1980s but suddenly collapsed since? Due to the lack of data it might be risky to give

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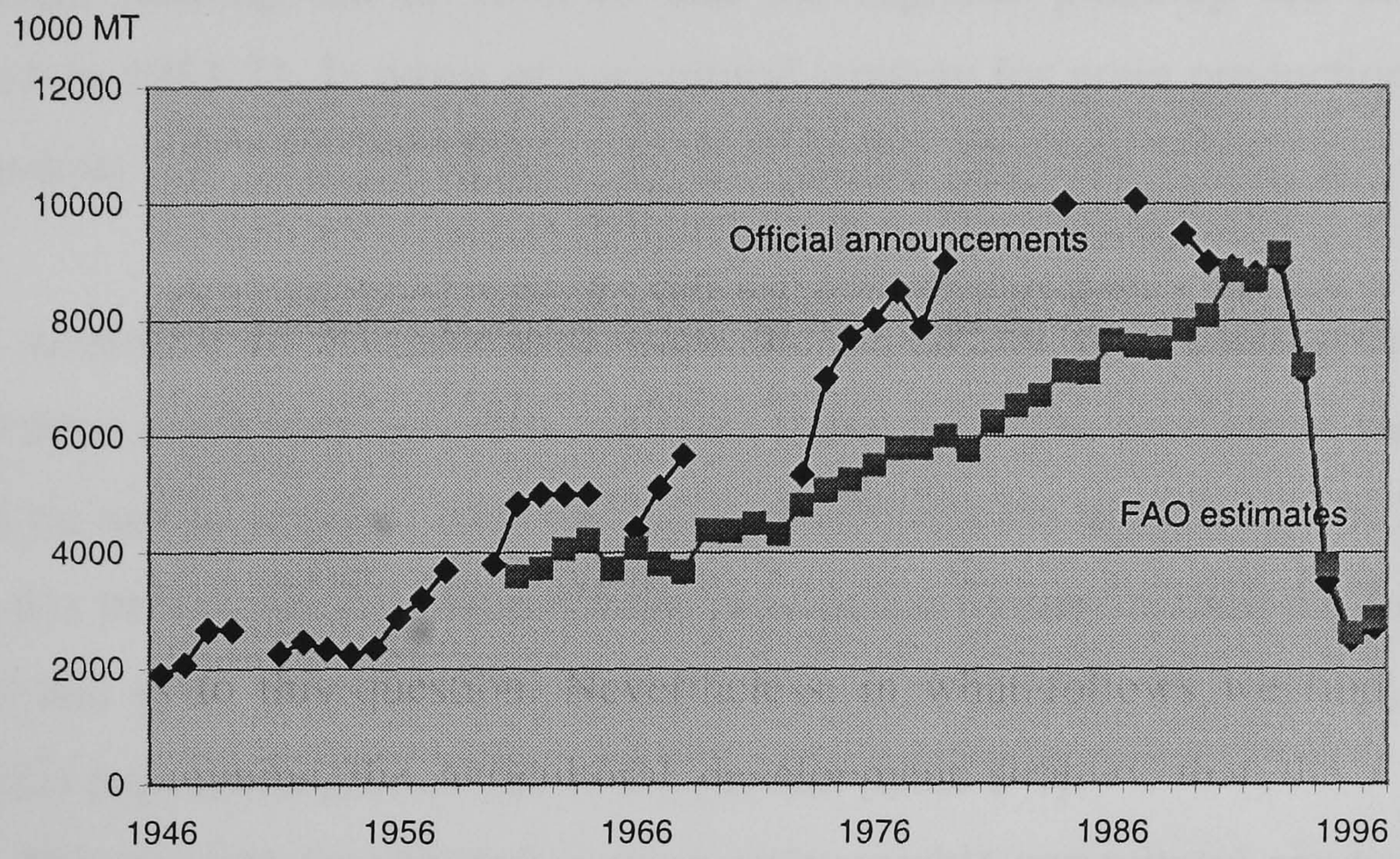
[227] Yonhap News Agency, 19 Jan.1998

[228] Some might argue that official DPRK announcements and FAO statistics are exaggerated and thus unreliable. We agree with this argument to some degree. At the same time, however, we believe that both statistics are the only chance to study the DPRK agriculture in reasonable manners and there are rational ways to utilise them. See Appendix II of this thesis for the manners and rationale for using both statistics.

robust answers to this question. Nevertheless, in what follows we find a possible answer by examining the agricultural development strategy that the country has exercised to increase its grain production for the last five decades.

Fig.6-1. The DPRK Grain Production



Source) table 6-3 and 6-4

Table 6-2. Grain Production and Population Growth: Annual Growth Rates (%)

	Private Farming Era (1946-53)	Regional Planning Era (1953-73)	Central Planning Era (1973-87)	The Era of Confusion (1987-97)
I. Production				
official claim (A)	2.95	4.24	4.62	-12.32
FAO estimates (B)	-	-	3.27	-9.24
II. Population				
Official claim (C)	-1.23	3.03	1.63	1.00*
III. Difference				
(A) – (C)	4.18	1.21	2.99	-13.32
(B) – (C)	-	-	1.64	-10.24

*annual average between 1985and 1999
Source) 1. For production, table 6-3 and 6-4
2. For population, table 6-5

6.3.1. Agricultural Strategy for Grain Production: 1946-73

As shown by table 6-2, the DPRK agricultural performance differed greatly between the private farming era in 1946-53 and the regional planning era before Juche Nongbub in 1953-73. In terms of agricultural strategy for grain production, however, both periods had little differences. In this section therefore we do not distinguish them.

According to official announcements, the DPRK grain production increased around three times between 1946 and 1973 [table 6-3]. The production increased 3.8 percent on annual average, well exceeding the population growth rate of 3.2 percent during this period. FAO statistics do not provide the figures in 1946-60. Instead, they suggest that grain production increased 2.8 percent annually in 1961-73, exceeding the annual population growth rate of 2.6 percent [table 6-4].

This progress is impressive given unfavourable agricultural conditions in this period. The DPRK inherited an underdeveloped agriculture from the Japanese rule, which generated a food crisis in 1945-46, and then experienced serious agricultural setbacks during the Korean War that led to another food crisis in 1955-56. There were also successive institutional changes, including land reform, agricultural cooperativisation and increasing market controls, which in many other socialist countries caused serious agricultural stagnation. Moreover, agriculture faced permanent labour shortages. As shown by table 6-5, the share of rural population declined to 43 percent of total population in 1975 from 82 percent in 1953; and this trend has not been reversed until present.

From these unfavourable conditions some might argue that official announcements and FAO statistics exaggerate the production. We agree with this argument. But we should point out that the (increasing) trend of grain production during this period was real, although the absolute levels of the production might be inflated. It is because a systematic strategy to increase total quantitative volume of grain production was established in this period.

Table 6-3. The DPRK Grain Production (Official Announcements): 1946-1997

(1000 MT)

	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959
Total	1898	2069	2668	2654		2260	2450	2327	2230	2340	2873	3201	3700	
Rice	1052			1158				1229			1392			
Maize	156			375				224			760			
Other	690			1121				874			721			

	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973
Total	3803	4830	5000	5000	5000		4405	5110	5672					5343
Rice	1535	1796												
Maize	950	1549												
Other	1318	1485												

	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
Total	7000	7700	8000	8500	7870	9000					10000	
Rice												
Maize												
Other												

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Total		10059*		9490*	9000	8900	8800	9000	7100	3500	2500	2700
Rice				4320	4480	4090	4450	4750	3110	2000	1410	1570
Maize				4340	3900	4200	3720	3940	3550	1370	830	1010
Other												

* converted into physical outputs from growth rate figures

Source) 1. For all figures between 1946 and 1961, *Chosun Joongang Nyungam*
2. For total grain production [*algok*] between 1962 and 1989, ROK Ministry of Unification *Bukhan Gyungje Tongyejip [Collected North Korean Economic Statistics]*, 1996
3. For total grain production [*algok*] between 1990 and 1997, Hirata (1998)
4. For rice and maize between 1989 and 1997, UNDP/DPRK (1998a)

Table 6-4. The DPRK Grain Production (FAO Statistics): 1961-1997

(1000 MT)

	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974
Total	3583	3725	4054	4212	3707	4073	3788	3662	4378	4365	4499	4310	4817	5068
Rice	1809	1897	2073	2176	1905	2128	1977	1913	2343	2328	2407	2312	2599	2710
Maize	1245	1305	1430	1505	1315	1465	1365	1320	1620	1610	1670	1595	1790	1915
Other	529	523	551	531	487	480	446	429	415	427	422	403	428	443

	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
Total	5247	5491	5799	5798	6006	5752	6255	6523	6707	7128	7097	7650	7559	7517
Rice	2814	2854	3061	2957	3060	2646	3045	3204	3290	3496	3369	3805	3538	3394
Maize	2000	2200	2300	2400	2500	2700	2800	2900	3000	3200	3300	3400	3500	3600
Other	433	437	438	441	446	406	410	419	417	432	428	445	521	523

	1989	1990	1991	1992	1993	1994	1995	1996	1997
Total	7824	8071	8836	8681	9137	7215	3787	2596	2866
Rice	3500	3570	4120	4500	4787	3177	2016	1426	1527
Maize	3800	4000	4200	3718	3937	3547	1366	825	1014
Other	524	501	516	463	413	491	405	345	325

Source) FAO Statistical Database

Table 6-5. The DPRK Population: 1946-99

(thousand, %)

	1946	1949	1953	1956	1959	1960	1963	1965	1970	1975	1980
Total	9257	9622	8491	9359	10392	10789	11568	12408	14619	15986	17298
	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)
Rural	-	-	6988	6645	6443	6409	6420	6514	6695	6922	7455
	(-)	(-)	(82)	(71)	(62)	(59)	(56)	(52)	(46)	(43)	(43)
Urban	-	-	1503	2714	3949	4380	5148	5894	7924	9064	9843
	(-)	(-)	(18)	(29)	(38)	(41)	(45)	(48)	(54)	(57)	(57)

	1982	1985	1986	1987	1993	1999
Total	17774	18792	19060	19346	20522	21797
	(100)	(100)	(100)	(100)	(100)	(100)
Rural	7412	7705	7795	7816	8021	-
	(42)	(41)	(41)	(40)	(39)	(-)
Urban	10362	11087	11265	11530	12501	-
	(58)	(59)	(59)	(60)	(61)	(-)

* It is unknown whether the figures in 1946-1963 include military population.

* The figures in 1965-99 exclude military population.

Source) 1. For 1946-63, *Chosun Joongang Nyungam*
2. For 1965-87, the DPRK's submission to UNDP available from Eberstadt and Banister (1992: p.20)
3. For 1993, the DPRK Central Bureau of Statistics (1995)
4. For 1999, the DPRK's submission to FAO/WFP (8 Nov.1999)

The strategy entailed three agricultural policies: 1) the persistent increase in grain sown area; 2) the radical shift of crop composition from low-yield grain items to high-yield items; 3) the maximisation of agricultural inputs for grain production or four agricultural modernisation programs: irrigation, chemicalisation, mechanisation and electrification.

Above all, the government made continuous efforts to increase grain-sown area. A massive-scale of New West Coastline Land Expansion Project was launched right after the liberation from the Japanese rule; and successive mountain cultivation programs followed. A series of land rehabilitation programs for destroyed and neglected land during the colonial era and the Korean War were carried out, and

traditional land borders by individual owners were abolished to increase actual sown areas. State economic plans included clear quantitative targets for land expansion, which were in turn imposed on both local governments and cooperative farms in the form of annual and quarterly targets. Due to these efforts grain-sown area increased remarkably between 1946 and 1975. According to official announcements, it increased up to 2.3 million *Chungbo* in 1960 from 1.7 million in 1946 by more than 30 percent [table 6-6]. And FAO statistics suggest that this increase continued between 1961 and 1973 [table 6-7].

In addition to the expansion of grain-sown area, the government attempted to increase grain yields as well. The most important policy taken for this purpose was to transform the country's crop composition in favour of two high yield grain items: rice and maize. Table 6-6 and 6-7 show that there was a dramatic change in the composition of grain cultivation between 1946 and 1973. According to official announcements, the share of rice and maize in total grain-sown area was 23 percent and 10 percent in 1946, respectively. Hence, though important, they were far from being dominant grain items. Rather, other grains such as starchy, pulse and beans were more important for both agricultural production and people's food diet, comprising 66 percent of total grain-sown area. In 1960, however, the share of maize rocketed up to 34 percent, while that of other grains declined to 44 percent. And FAO statistics suggest that this trend continued until 1973 when the share of rice and maize rose up to 37 percent and 40 percent respectively, showing that they were now the dominant grain items in the DPRK.

Table 6-6. Sown Areas by Grain Items (Official Announcements): 1946-60

(1000 Chungbo, %)

	1946	1947	1948	1949	1951	1952	1953	1954	1955	1956	1957	1958	1960
Total	1670	2013	2127	2112	1904	2062	2103	2111	2099	2165	2255	2264	2279
	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)
Rice	388	420	444	382	380	406	432	452	455	493	500	504	500
	(23)	(21)	(21)	(18)	(20)	(20)	(21)	(21)	(22)	(23)	(22)	(22)	(22)
Maize	174	239	275	282	249	247	241	236	335	608	759	826	784
	(10)	(12)	(13)	(13)	(13)	(12)	(11)	(11)	(16)	(28)	(34)	(36)	(34)
Other	1108	1354	1408	1448	1275	1409	1430	1423	1309	1064	996	934	995
	(66)	(67)	(66)	(69)	(67)	(68)	(68)	(67)	(62)	(49)	(44)	(41)	(44)

Source) *Chosun Joongang Nyungam*

Table 6-7. Sown Areas by Grain Items (FAO Statistics): 1961-97

(1000 ha, %)

	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973
Total	1432	1436	1476	1479	1460	1484	1490	1483	1508	1510	1514	1523	1558
	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)
Rice	420	440	450	480	480	500	500	500	530	530	530	530	570
	(29)	(31)	(30)	(32)	(33)	(34)	(34)	(34)	(35)	(35)	(35)	(35)	(37)
Maize	525	530	530	535	535	540	540	550	560	570	590	610	630
	(37)	(37)	(36)	(36)	(37)	(36)	(36)	(37)	(37)	(38)	(39)	(40)	(40)
Other	487	466	496	464	445	444	450	433	418	410	394	383	358
	(34)	(32)	(34)	(31)	(30)	(30)	(30)	(29)	(28)	(27)	(26)	(25)	(23)

	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Total	1592	1616	1618	1635	1638	1635	1611	1630	1618	1605	1635	1603	1628
	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)
Rice	600	625	630	650	657	660	650	670	670	658	700	670	700
	(38)	(39)	(39)	(40)	(40)	(40)	(40)	(41)	(41)	(41)	(43)	(42)	(43)
Maize	650	670	680	690	690	690	690	690	690	690	690	690	680
	(41)	(41)	(42)	(42)	(42)	(42)	(43)	(42)	(43)	(43)	(42)	(43)	(42)
Other	342	321	308	295	291	285	271	270	258	257	245	243	248
	(21)	(20)	(19)	(18)	(18)	(17)	(17)	(17)	(16)	(16)	(15)	(15)	(15)

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Total	1703	1690	1671	1655	1556	1546	1493	1527	1503	1390	1432
	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)
Rice	700	700	650	650	588	592	589	583	582	580	611
	(41)	(41)	(39)	(39)	(38)	(38)	(39)	(38)	(39)	(42)	(43)
Maize	680	660	700	680	643	644	628	638	670	589	602
	(40)	(39)	(42)	(41)	(41)	(42)	(42)	(42)	(45)	(42)	(42)
Other	323	330	321	325	325	310	276	306	251	221	219
	(19)	(20)	(19)	(20)	(21)	(20)	(18)	(20)	(17)	(16)	(15)

( ) Composition

Source) FAO Statistical Database

Table 6-8 explains the reason why this change was made. Between 1946 and 1960 grain yield per *Chungbo* was 2.9 MT for rice and 1.12 MT for maize, but only 0.8 MT for other grains. This means that there were great chances to increase total grain production by replacing other grain items with rice and maize. The difficulty was however that the country's mountainous geography did not allow the swift

expansion of paddy fields for rice production and existing farming style made producers reluctant to increase maize production. Traditionally North Korean farm households preferred other grains than maize for two reasons: 1) double/triple cropping of other grains was important to prevent soil exhaustion; 2) they were easy to cultivate in the sense that they required relatively little fertilisers. By contrast, maize was not suitable for double cropping and needed heavy fertilising.

Table 6-8. Grain Yields (Official Announcements): 1946-60

(MT per Chungbo)

	1946	1949	1953	1956	1960	Average
Total	1.14	1.26	1.11	1.33	1.67	1.30
Rice	2.71	3.03	2.84	2.82	3.07	2.90
Maize	0.90	1.33	0.93	1.25	1.21	1.12
Other	0.62	0.77	0.61	0.68	1.32	0.80

Source) *Chosun Joongang Nyungam*

To resolve this difficulty three measures were institutionalised. First, during the 1953-58 agricultural cooperativisation the authorities deprived farm households of the rights of crop selection. Second, as the new agricultural management system was introduced in 1961, regional food self-sufficiency was emphasised to encourage local agricultural agencies to change crop compositions in favour of high yield grain items.[229] Third, the authorities divided agricultural areas into flat, intermediate and mountainous areas, setting up 'standard crop composition' for each area. By the early 1970s rice had been a standard crop item for flat area, the combination of rice and maize for medium area and other grains for mountainous area.

Another policy to increase grain yields was to maximise agricultural inputs. From the Japanese rule it was well known among policy makers that such agricultural inputs as water supply and (chemical) fertilisers had great effects on grain yields. Both factors became even more important as the new socialist government emphasised rice and maize production. The expansion of paddy fields for rice

[229] See section 4.4.2.2.2 in chapter 4

production depended on the level of water supply, and the success of maize production was largely affected by the supply of chemical fertilisers. In addition to water and fertiliser, agricultural machinery appeared as an important issue in the 1950s when agriculture faced labour shortages after the Korean War and agricultural cooperativisation was completed. From its very beginning, therefore, the government identified agricultural modernisation as increasing the supplies of four major agricultural inputs: water, (chemical) fertiliser, machinery and electricity.

To increase those inputs, on the one hand, the government emphasised so-called 'the synchronised development of agriculture and industry. It referred to the principle that, when economic resources were transferred from agriculture to industry in the early stage of industrial development, the priority within industry should be given to the sectors producing goods for agricultural production and conversely, when industry developed rapidly, the resources should be transferred from industry to agriculture. On the other hand, the authorities imposed on state agricultural agencies, not on producers, the responsibilities to provide all necessary inputs for agricultural production. PREC had its own resource supply firm, being responsible for procuring industrial products and distributing them among CCMCs. And CCMC owned all local facilities and controlled local industrial factories producing agricultural inputs, being finally responsible for the input supply to producers.

Table 6-9. Gross Industrial Production in the DPRK: 1946-73

(1946 =100)

	1946	1950	1955	1960	1964	1970	1973
Gross Industrial Production	100	295	485	2100	3700	7130	11410
(means of production)	100	333	488	2300	3700		
(consumption goods)	100	254	497	2000	3700		

Source) *Chosun Joongang Nyungam*

Due to both policies agricultural inputs increased drastically in accordance with industrial development. According to official announcements, the DPRK industrial outputs increased more than hundred times in 1946-73 [table 6-9]. In parallel, chemical fertiliser consumption in agriculture increased around eight times between 1946 and 1974 [table 6-10]. Irrigated land expanded more than five times

Table 6-10. Agricultural Inputs (Official Announcements): 1949-74

A. Fertiliser (1000 MT)

	1949	1956	1960	1961	1962	1963	1964	1969	1973	1974
Total	260	215	307	501	566	599	640			
Per chunngbo (kg)	131	113	160	249	281	300	321	512	1000	1000

B. Irrigated Land (1949 =100)

	1949	1953	1956	1960
Land	100	145	230	510

C. Tractor in Use

	1953	1954	1956	1957	1958	1960	1961	1962	1963	1964	1974
Number (15 hp)	764	800	2561	2554	2671	12500	13996	15692	18002	20000	72008
Area (1000 Chungbo)	95	162	487	854	1202	5910	6227				

D. Rural Electricity

	1953	1958	1961	1963	1964	1966	1968	1974
Total Consumption (1953 =100)	100	474		738	1077			
Ri with electricity supply (% of total Ri)	47.2	67	92.1	93.3	95.5	98.2	100	100
Farm households with electricity supply (% of total farm households)	41	49	62	71	81	86.1	91.2	100

Source) *Chosun Joongang Nyungam*

Table 6-11. Agricultural Inputs (FAO Statistics): 1961-97

(1000 ha)

	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973
Fertiliser (1000MT)	112	139	158	164	173	186	208	250	251	309	338	361	371
Tractor in use (1000)	9	10	12	13	13	14	16	17	18	20	21	22	23
Irrigation	500	500	500	500	500	500	500	500	500	500	500	600	700

	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Fertiliser (1000MT)	416	434	551	611	767	749	729	786	740	791	774	844	756
Tractor in use (1000)	24	25	26	27	33	39	44	50	56	62	68	68	69
Irrigation	800	900	1000	1030	1060	1090	1120	1150	1180	1210	1240	1270	1300

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Fertiliser (1000MT)	746	812	815	832	811	783	766	323	104	93	171
Tractor in use (1000)	70	71	72	73	74	75	75	75	75	75	75
Irrigation	1330	1360	1400	1420	1440	1460	1460	1460	1460	1460	1460

Source) FAO Statistical Database

between 1949 and 1960. The number of tractors increased around hundred times between 1953 and 1974, and all farm households had been supplied with electricity by 1974. Of course FAO statistics provide different numbers [table 6-11]. Nonetheless they also suggest that the level of agricultural inputs rose up drastically during this period.

Given the above three agricultural policies, including the expansion of grain-sown area, the transformation of crop composition into high-yield grain items and the level-ups of agricultural inputs, it would not be surprising that grain production had an increasing trend between 1946 and 1973.

6.3.2. The Strategy for Grain Production: 1973-87

For the years of 1973-87 the DPRK grain production was most successful. According to official announcements, the production increased on the annual rate of 4.62 percent, finally reaching 10 million MT in 1984 that had long been conceived as the level with which the government could provide enough 'rice rations' to the whole population. FAO statistics assess the production slightly lower than official announcements. Nevertheless, they still suggest that this period saw the most rapid increase in grain production.

Clearly this increase was the result of ongoing agricultural policies that had been previously established to increase grain production. Indeed the government intensified the efforts to expand grain-sown area. In 1974, for instance, the mass campaign of 'finding 300 thousand chungbo of new land' was launched, which was soon followed by the well known 'terraced field cultivating campaign' in 1985 that cut and transformed all the mountainous areas below the slope of 30 degree into terraced fields. As a result, grain-sown area increased up to 1.7 million hectares, the historically highest level, in 1984 [table 6-7].

The transformation of crop composition into high-yield grain items continued, too. During this period the policy was unfolded in the form of: 1) increasing the share of rice production in intermediate areas that had previously focused on maize production; 2) spreading maize production to mountainous areas that had produced

mostly other minor grains and thus had not been self-sufficient on food. As the result, the share of rice had risen up to 43 percent of total grain-sown area by 1986 and that of maize to 42 percent.

Agricultural input supply also went on smoothly. Between 1973 and 1987 fertiliser supply increased by 78 percent; irrigation areas by 65 percent; and the number of tractors tripled [table 6-11].

However, the most distinctive feature of this period was not the continuity of the existing agricultural policies, but the fact that the government introduced new agricultural technologies and practices in order to achieve the DPRK version of green revolution. Note that *Juche Nongbub* first appeared in 1973. It was during this period that *Juche Nongbub*, particularly its technical aspects, were fully developed, beginning to characterise all agricultural practices in the DPRK.

New agricultural practices started with a simple idea entailed by *Juche Nongbub*: 'dense planting' would be the most effective way to increase grain production in a country where arable land is limited. Due to the idea cooperative farms were forced to plant from 6-70,000 maize seeds per hectare to 100,000 seeds, in contrast to 50,000 seeds in most other countries.[230] At first sight, dense planting might look plausible. In reality, however, it is more likely to reduce grain yields for several reasons. Firstly, it prevents plants from absorbing enough sunshine, damaging their growths. Secondly, it accelerates soil exhaustion, leading to the long-term decline in grain yields. Thirdly, densely planted seeds need more intensive care that may not be available in large-scale collective farms where agricultural production is organised in highly administrative ways. Due to these adverse effects China abandoned dense planting shortly after the great production failures and corresponding famine in 1959-61.[231]

Moreover, there was another problem in the DPRK. From the early 1970s, as mentioned above, the government forced maize production even to mountainous areas where weather is colder and so growing season is shorter. It was therefore doubtful whether dense planting could work properly in such unfavourable natural conditions.

To resolve those problems of dense planting, the government organised numerous agricultural projects, the results of which were aggregated, standardised and

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[230] Shin, Dong Wan et al (1998), p. 174-76

spread across the country under the name of *Juche Nongbub* in 1973-78. Perhaps the first and utmost project was to develop new seed varieties suitable for dense planting. To do this, on the one hand, state agricultural agencies imported wide ranges of seed varieties from the Soviet Union and China and mixed them with traditional North Korean seed varieties. On the other hand, a national scale of land research project was carried out, on the basis of which newly developed varieties were experimented in all different land and weather conditions.[232] Through these procedures, all existing rice and maize varieties were replaced with new ones in the mid/late 1970s [table 6-12].

Table 6-12. Major Seed Varieties in the DPRK

	Before 1970s	1970s and 80s	Since 1980s
Rice	Ryongsung 25, Ryongsung 26, Hamnam 15	Pyongyang 15, Pyongbok 3, Yeomju 14, Yeomju 1, Seohaechal	Pyongyang 15, Pyongyang 9, Pyongyang 4 Yeomju 1, Seohaechal
Maize	Long Fellow, Mammoth White	Soksung 1, Gangsang 4, Eunchon 5, Pyongnam 6, Eunsan 3, Shingye 15, Euiju 2	Whasung 1, Whasung2, Eunchon 5, Whangju 1, Haeju 1

Source) Shin Dong Wan et al (1998) p. 103 and 162-163

Another project was to establish new agricultural standards of planting and fertilising.[233] The new planting standards were invented for maximising the osmosis of sunshine per plant and the new fertilising standards for increasing nutrient supplies to plants and preventing their diseases. The former was embedded in new planting machines in order to reduce human errors in actual practices, being introduced to cooperative farms in 1976. And the latter was reflected in the worksheets of cooperative farms in the mid/late 1970s.

Agricultural project to prevent soil exhaustion was also carried out. It mainly involved three new responsibilities of cooperative farms: regular soil changes, after-harvest-ploughing and organic fertiliser production.[234] Now all cooperative farms should obligatory replace their soils with those of other fertile lands every four or five

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[231] Chang, Hae Sung (1999), p.22
[232] Lee, Chul Hee (1986), p. 31-32 and Park Young Ho (1994), p. 169
[233] Park, Young Ho (1994), p. 176-78 & p.218-219
[234] Lee Chul Hee (1986), p. 90-91 and Shin Dong Wan et al (1998), p. 177-8

years. They should also carry out after-harvest-ploughing to expose exhausted soils two times every year - in winter and in spring before planting started. Moreover, they should meet the quantitative targets of traditional organic fertilisers called *Toebi* made out of leaves and human and animal manure.

Protecting maize seeds from cold weather constituted another issue of agricultural projects. To do this new maize seedling practices were established. The practices demanded producers to plant and grow maize seeds first in hothouses and then transfer their baby plants into fields just like rice. If it was not possible, another method called 'humus-cake nurseries for growing maize seedlings [*kangnaengi youngyangdanzi*]' was applied.[235] It demanded producers to make a round cake with the diameter of 3-5cm in which a maize seed was in the centre, fertilisers surrounded the seed and clay was in outer space, and to plant this cake after deeply digging the fields. The idea was that the heat from fertilisers in the cake could protect maize seeds from cold weather.

The final project was about dissolving agricultural production processes into a series of simple labour processes and thus playing down the importance of human labour. In case of plating, for instance, labourers were grouped into three teams: tractor/planting machine teams, correction teams and watering teams. Tractor teams simply drove tractors that automatically carried out planting works. Correction teams followed tractor teams, raising up and refitting fallen plants. And watering teams followed correcting teams, watering the plants.

It is difficult to assess how successful those new agricultural practices were. Nevertheless there are two good reasons to believe that at least they did not fail immediately. Let us first look at table 6-13. It shows that grain yield jumped up around the late 1970s/early 1980s. In case of maize, for instance, the yields steadily increased to 2.99 MT per hectare in 1975 from 2.37 MT in 1961, suddenly jumping up to 3.91 MT in 1980. These figures suggest that both dense planting and new agricultural practices to prevent the problems of dense planting might have positive effects on grain yields. Secondly, the country has still maintained dense planting although the situation has slowly changed as the recent food crisis has deepened. If

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[235] Shin Dong Wan et al (1998), p. 167-176

this practice had huge negative effects on grain yields, it must have been abandoned long before as in China.

Table 6-13. Trends of Grain Yields in the DPRK (FAO Statistics)

(MT per ha)

	1961	1965	1970	1975	1980	1985	1990	1995
Grain – Total	2.50	2.54	2.89	3.25	3.57	4.43	4.88	2.52
Rice	4.31	3.97	4.39	4.50	4.07	5.03	5.49	3.46
Maize	2.37	2.46	2.82	2.99	3.91	4.78	5.88	2.04
Other	1.09	1.09	1.04	1.35	1.50	1.76	1.54	1.61

Source) FAO Statistical Database

6.3.3. The Collapse of the Strategy: Since 1987

The DPRK has suffered disastrous setbacks in its grain production since 1987. Between 1987 and 1996 the production declined to 2.5 million MT from 10 million MT according to official announcements, or to 2.6 million MT from 7.6 million MT according to FAO statistics. Although both statistics provide different numbers, they commonly suggest that the production dramatically collapsed in the 1990s.

At a first glance, it might be odd that the country, which had seen a steady increase in grain production for around four decades, suddenly faced a production collapse. However, when we take into consideration the factors that had boosted the country's production until the 1980s, it might not be so surprising. Indeed all the existing agricultural policies and practices that had previously increased grain production have worked in quite reverse ways since 1987.

Consider grain-sown area. As shown by table 6-6, the sown area reached the peak in 1986 and has persistently fallen since. And the decline was paramount in the 1990s. For instance, the 1996 grain-sown area was mere 1.39 million hectares, even lower than the 1961 level.

The fact that the government launched the 'terraced field cultivating campaign' in 1985 paradoxically shows that the expansion of arable land already hit the limit in that time. Hence, it would be understandable even if the area did not increase further in the 1990s. But it actually fell. Why? A possible answer is the poor

management of terraced fields. In principle, terraced fields should have appropriate defence facilities against landslides as well as irrigation facilities to raise grain yields. In reality however such facilities did not exist or were poorly managed. Indeed it has been frequently reported since the early 1990s that due to terraced fields heavy rains have easily led to floods with severe landslides, destroying not only terraced fields but also near flat lands.[236] In addition, international aid agencies such as FAO and WFP have found in their regular visits to the country that the grain yields in terraced fields were extremely low, advising that the country should stop cultivating the fields given scarce other agricultural resources.[237] This advice has been accepted by the DPRK authorities since 1996, which is a reason why grain-sown area declined particularly rapidly in the mid/late 1990s.

What about the transformation of crop composition into high-yield grain items? Similarly to grain-sown area, the share of rice and maize in total grain production reached the peak in 1985-86, which have not changed greatly since. This means that there has been no room to increase grain production by simply expanding the share of two high-yield grain items. Conversely, due to its high fertiliser consumption the government has increasingly discouraged maize production since 1997.[238] It suggests that the share of both rice and maize in total production is likely to decline in near future rather than rise.

The situation was most dramatic in the supply of agricultural inputs. Let us look at fertiliser supply in table 6-9. Between 1987 and 1997 fertiliser supply declined on the annual average rate of 15.9 percent: consequently the 1996 fertiliser consumption collapsed to mere 93,000 MT, almost one ninth of the 1986 level. Of course, the figures for other inputs such as tractors and irrigated land did not change greatly. Note however that these figures are stock and there were great shortages of energy and agricultural machinery parts in the 1990s. Indeed, the country's energy consumption declined on the annual rate of 11 percent in 1992-96 mainly due to the cessation of oil import from the Soviet Union.[239] And international aid agencies have

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[236] Lee Young Bum (1999)
[237] FAO/WFP(12 Nov.1998)
[238] Kim and Jeon (1999a)
[239] Since the oil import from the Soviet Union collapsed in the early 1990s, the DPRK oil consumption reduced dramatically. Total oil consumption declined for seven consecutive years from 1990 to 1997 on annual rate 12.3 percent. In consequence, the 1997 oil consumption was less than 40 percent of the 1990 level.

observed that due to the shortages of spare parts a vast majority of machinery, including tractors and irrigation facilities, was useless or destroyed.[240] It suggests that the situation in the supply of those inputs was not different to that in fertiliser supply.

The basic reason for this decline in agricultural inputs was the collapse of industrial production. Table 6-14 presents the composition of the DPRK national output in 1992-96. The data show that industrial output declined by more than 60 percent only for four years. Actually the fall in industrial output was far more dramatic than in agricultural output. It is beyond the scope of this thesis to study the reasons why there was an industrial collapse in the 1990s. Perhaps the breakdown of the USSR and the increasing difficulties of domestic resource mobilisation played important roles. However what the data suggest is that this industrial collapse was the main immediate factor leading to the input collapse in agriculture.

Table 6-14. The Composition of National Output: 1992-96

(million US dollar)

	1992	1993	1994	1995	1996
Total	20875	20935	15421	12802	10588
Agriculture	7807	8227	6431	5223	4775
Industry	4551	4689	3223	2228	1556
Construction	1315	1256	910	819	508
Other	7160	6762	4858	4532	6748

Source) DPRK's submission to IMF quoted by Noland, Robinson and Wang (1999)

This decline in agricultural inputs had particularly adverse effects on grain production, because it led to the immediate collapse of existing agricultural practices.

[The DPRK Oil Consumption]

(thousand barrel per day)

	1988	1990	1991	1992	1993	1994	1995	1996	1997
Total	67.7	72.1	62.1	53.5	43.9	38.3	33.5	29.4	28.6
(Motor Gasoline)	23.8	24.0	20.3	17.4	14.6	12.4	10.5	8.9	8.6
(Gas Diesel)	24.5	26.6	22.5	19.9	16.5	14.8	13.4	12.0	11.7
(Heavy Fuel Oil)	11.3	12.8	11.1	9.0	6.6	5.5	4.4	3.6	3.5

Source) International Energy Agency, Energy Statistics of Non-OECD Countries, various years

[240] Indeed, FAO/WFP mission teams observed:

"The highly mechanised DPR Korea agriculture faces a serious constraint as about four-fifth of motorised farm machinery and equipment is out of use due to obsolescence and lack of spare parts and fuel During the field visits the Mission saw a large portion of tractors, transplanters, trucks and other farm machinery lying unused and unusable. In fact, because of non-availability of trucks, harvested paddy has been seen left on the fields in piles for long periods" (FAO/WFP: 12 Nov.1998)

Present agricultural practices were established to resolve the problems of dense planting. For these practices to work properly a certain level of agricultural input supply was essential. Without appropriate fertiliser supply, for instance, it would be impossible to make humus-cake nurseries to protect maize seeds from coldness. It would be also difficult to provide enough nutrient supplies to plants and prevent their diseases under dense planting. What about the shortage of agricultural machinery? Present practices consist of numerous simple labour processes in which agricultural machinery plays the central role. In case of planting, for instance, tractors or planting machines carry out actual planting and human labourers simply raise up fallen plants after the machines finish the works. It means that agricultural productivity is decisively dependent on the quantity and quality of the machinery. Of course it must be possible to replace the machinery with human labours. Nevertheless, given that all existing practices have been standardised along the machinery, its shortage should lead to the immediate decline in productivity.

In short, the years of 1987-97 saw that all the existing agricultural policies collapsed, leading to grain production failures. Grain-sown area declined; the share of high-yield grain items did not rise or even declined; agricultural input supply collapsed and thus the present agricultural practices requiring a high level of input also supply collapsed. Because the practices prevented the problems of dense planting, their collapse meant that grain yields should be adversely affected by dense planting. Given these factors it would be odd if grain production has not fallen significantly since 1987.

6.3.4. Food Shortages, Agricultural Strategy for Grain Production And the 1987-99 Food Crisis

From the above discussion we can identify the DPRK agricultural strategy to increase grain production with the following five policies: 1) the expansion of grain-sown area; 2) the transformation of crop composition in favour of high-yield grain items; 3) the maximisation of agricultural inputs on the basis of corresponding industrial development; 4) the introduction of dense planting; 5) the establishment of agricultural practices to prevent the problems of dense planting. Of them, the first

three policies characterised agriculture between 1946 and 1973. And the last two were dominant from the introduction of *Juche Nongbub* in 1973 to the eve of recent food crisis in 1987.

Owing to this strategy the country had managed to increase its grain production five times between 1946 and 1987, modernise its agriculture and establish its own agricultural practices. An interesting point is that the strategy explains the DPRK food shortages well. That is, the DPRK food shortages have occurred when external shocks temporarily prevented the above strategy from working properly and thus grain production stagnated temporarily.

For instance, the 1954-55 food crisis occurred with the 1954 grain production failure, which was in turn caused by the post-war resource shocks in agriculture. Due to the Korean War grain-sown area declined by 30 percent in 1951-53 and the number of animals fell by 20 percent.[241] Because industrial production dropped by 40 percent, agricultural input supply by industry also collapsed. Two of three agricultural policies that had been utilised to increase grain production before 1973 did not work properly due to the post-war resource shock.

The 1970-73 food shortages provide a similar example.[242] In the late 1960s industrial development decelerated and military confrontation with the US intensified. In agriculture, labour shortages worsened due to increasing labour shifts to industry and military sector. Both factors destabilised agricultural input supplies, which in turn led to agricultural stagnation.

The recent food crisis is similar to the previous ones in the sense that it happened because the strategy to increase grain production did not work properly due to external shocks such as domestic industrial collapse and the sudden drop in energy import from the Soviet Union. But there are two fundamental differences. In case of the recent food crisis, as seen already, the five policies to increase grain production collapsed totally while only some of them did not work properly in the previous shortages. In consequence, both the degree and period of production failures and the severity of food shortages were much greater in the recent crisis. Second, all the five policies eventually proved unsustainable and thus the recent food crisis must be much difficult to overcome. It is straightforward that both the expansion of grain-sown area

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[241] See table 5-2 in chapter 5

and the transformation of crop composition into high-yield grain items can not go forever. Actually the recent food crisis proved it. In addition, the present agricultural practices presuppose a high level of agricultural input supply such as machinery, fertiliser and energy. Without this supply the practices would greatly reduce grain yields due to the problems of dense planting. Given the ongoing industrial stagnation as shown by table 6-11, however, it is doubtful whether the DPRK can secure the supply. This means that the existing DPRK strategy to increase grain production is not realistic until its industry recovers fully, and in order to overcome the recent crisis therefore new strategies, say, the massive import of foreign agricultural technologies and capital and corresponding institutional changes in domestic agriculture may be necessary.

6.4. Three Controversial Issues Surrounding the Food Crisis

So far we have seen that the DPRK has faced severe food shortages since 1987, and that the shortages were caused by the collapse of the country's strategy to increase grain production. Perhaps there could be no opposition to both facts. Apart from the facts, however, nothing has been agreed on the recent DPRK food crisis. In particular, the disputes are seemingly irresolvable over the country's food situation in the mid/late 1990s. In this section we summarise the disputes with three issues.

6.4.1. Was there famine? If there was, when and how severe was it?

In the past seven years the food crisis in the DPRK has provoked many debates among researchers, international NGOs, food donor countries and even UN aid organisations. In the centre of the debates lies the issue of whether the crisis developed into famine in the mid/late 1990s.

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[242] See section 5.2 in chapter 5

6.4.1.1. Was there famine?

Of course, most researchers and NGOs have believed that the existence of famine in the DPRK is undeniable.

> ... the worst famine in human history is now transpiring in North Korea.... The current status of wholesale starvation in North Korea is much worse than similar disasters such as the famine in Ethiopia and Somalia. It is the worst human tragedy of the late 20th century.[243]

As mentioned already, however, Pyongyang media has persistently denied this famine claim. Interestingly there are indeed some researchers supporting this official non-famine claim.

> It does not seem to be true that North Korea suffers from severe famine and civil riots for food, even though food supply is not enough. North Korea has tried to change its public food distribution system from central rationing system to regional one. Sometimes this change can cause severe food shortages in certain areas. However there is no evidence that North Korea suffers from overall famine and thus the situation is getting worse.[244]

More interesting is the attitude of UN aid agencies that have led international food aid to the DPRK and initiated aid activities in the country since 1995. On the one hand, they have announced that the DPRK has suffered an extreme scarcity of food since 1995. On the other hand, however, they have been very careful in using the word of famine when they have described the country's food situation. When they need to emphasise the severity of the DPRK food situation, they have used such words as 'grave food supply problems', 'on the knife edge of famine' and even 'famine in slow motion', but not the simple word of 'famine'. Furthermore, in many cases they pointed out that the DPRK avoided 'a wide scale famine' due to both the country's effective food distribution and international food aid, although there was a great possibility of the outbreak of famine.

> Is there famine in DPRK?

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[243] KBSM (1998)
[244] Han Ho Suk (1997)

> Outright famine has been avoided but its spectre still looms. Government estimates indicate the prevalence of malnutrition among children has now increased to 38 percent of the under-five-population. [245]

All these rather confusing arguments have made it difficult to judge whether the DPRK food crisis developed into famine.

6.4.1.2. How severe was the famine?

Needless to say, these confusions concerning the existence of famine have originated from the fact that there are no reliable statistics or estimates about so-called famine deaths in the DPRK. In other words, we do not know how severe the DPRK food crisis has been and how it has affected the country's demographic trends.

Of course, those who have believed the existence of famine have made various attempts to estimate the demographic impacts of the crisis. However, the results are extremely different from 'many millions of famine deaths' to 'hundreds thousands'.

> Among 22 million people, the population after the deduction of the number of ruling class in North Korea (approx. 15%, 3million) and farmers (approx. 30%, 6 million) is 13 million. When we adapt 28.7% of average mortality rate of the interviewee's family, the mortality is more than 3.5 million.[246]
>
> Famine deaths started to appear from 1995, and their number is estimated 7-80,000 on annual average until 1997. However, the number is estimated to decline to 40,000 in 1998 due to international aid. Total number of famine deaths between 1995 and 1998 is estimated around 270,000, comprising 26 percent of 1.02 million deaths for that period.[247]

In this reason Noland, Robinson and Wang (2001) say that, although there was a famine, its scale is unknown.

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[245] UNICEF, Update on UNICEF activities in DPR Korea, 1 Sep 1997
[246] KBSM (1998)
[247] ROK National Statistical Office (1999)

> As well as can be ascertained, North Korea is now into its ninth year of economic decline. It has been facing food shortages at least since the early 1990s and is experiencing a famine of unknown severity.[248]

In contrast, Pyongyang media has frequently claimed that there have been no famine deaths and the country's population has grown along the population trends revealed by its 1993 census. Meanwhile UN aid agencies have not made any concrete statistical announcements about the number of famine deaths in the DPRK. Instead, they focused on identifying the nutritional status of the population to have the implications of international food aid to the country.

In this respect the severity of the food crisis is as controversial as whether it developed into famine.

6.4.1.3. When was there famine?

It is also not clear, if the food crisis escalated to famine, when it did. In section 6.2 we have seen that the origin of the crisis can be back up to the year of 1987. Yet, most debates concerning the crisis have focused on the years since 1995 when the DPRK government officially appealed for international food aid so that the crisis was widely known to outside world.

In this circumstance some researchers addressed the issue of the timing of the food crisis (famine).

> A substantial body of new evidence indicates that the country has been experiencing a major famine with abnormally high mortality rates since 1994. The food crisis did not begin with the floods in August 1995, as has been commonly understood, but with the sharp reduction in heavily subsidised food, equipment, and crude oil from the Soviet Union and China in the early 1990s.[249]

> Although it did not raise great concerns, the issue is important in two respects. First, the DPRK government has argued that the basic reason for the country's food crisis since 1995 was the great flood in July/August 1995. Hence, the timing of the food crisis (famine) is closely related to the causation of the crisis (famine).

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[248] Noland, Robinson and Wang (2001), p. 741
[249] Natsios (1999)

In 1993, our government, under the guidance of the late General leader, President Kim Il Sung, had set out the framework for a new economic strategy which gave a new emphasis and precedence to agricultural development.....The repeated natural calamities of recent years-with their historically unprecedented floods and droughts-prevented the timely initiation of the plans and created the temporary production shortfalls and food shortages... The most immediate cause of current food shortages is the unprecedented series of natural disasters which have affected our country. It is important that these disasters were of such a magnitude that these shortages would have occurred even if other economic problems were not present.[250]

Second, it is important to estimate the demographic impact of the famine, if it existed, because undoubtedly the estimation period would have great influences on the estimation results.

6.4.2. Was the famine different from other famines?

Another controversial issue is whether the crisis (famine) was different from those in other countries. This issue concerns the basic features of the crisis.

6.4.2.1. Was it FAD famine or not? What was the causation of the famine?

Most researchers, NGOs and food donor countries have believed that the crisis (famine) occurred basically due to the country's food shortages caused by its (grain) production failures.

> The DPRK faces a grave food supply problem, aggravated by large reductions in output over the past two years due to adverse weather.... Only urgent mobilisation of food assistance would advert further hardship and possible starvation.[251]

> The DPRK is faced with a grave humanitarian crisis. At least five million people are currently affected by food shortages, and DPRK's Ministry of Public Health recently estimated that 38 percent of the children under five years of age –a staggering 800,000- are malnourished.

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[250] Choi Su Hon, Statement by Choi Su Hon, Vice Minister of Foreign Affairs of the DPRK, DPRK/UNDP (1998a)
[251] FAO/WFP (22 Dec. 1995)

> UNICEF, along with a growing number of aid organisations, are warning that the crisis is threatening to escalate into a widespread and deadly famine.[252]

It is also the official view of the DPRK government. However, some researchers have made a quite different argument: the crisis did not entail significant food shortages and, on the contrary, it occurred mainly due to food distribution failures.

> The immediate causation of famine was not food shortages, but the collapse of Public Distribution System (PDS).....In the DPRK famine, the question is why and how food was distributed asymmetrically, rather than how much food available declined. Even with stable food supply the amounts of food allocated for the population sharply declined, and inequality of the allocation more widened.[253]

A distinctive feature of modern economics of famine is that it has tended to distinguish FAD (food availability decline) famine and Non-FAD famine, showing that FAD is not the only causation of the famine. And it advises to look at how a person's ability to command food (entitlement) changes during the famine period rather than how total food availability changes.

The above quotation argues that the DPRK food crisis (famine) was not a FAD famine in spite of the country's paramount (grain) production declines in the 1990s as shown by the previous section. In this respect the causation of the DPRK food crisis (famine) is still controversial.

6.4.2.2. Were there the government's policy failures? Was it a controlled famine?

An important reason why some researchers argue that the DPRK food crisis is not a FAD famine is that they believe that the government effectively selected famine victims from certain social groups or at least made little efforts to save the victims of certain social groups. In this sense they regarded the DPRK famine as a 'controlled famine' by the government.

> In fact, when food supply declined in the late 1990s, the authorities primarily supplied food to special classes such as army, high party and government officials and Pyongyang residents, who

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[252] UNICEF, Update on UNICEF activities in DPR Korea, 1 Sep 1997

are absolutely necessary for the regime to survive, providing only small food to ordinary people irregularly....And it seems that a vast amount of money were wasted for military build-ups and political propaganda.... In addition, the closeness of North Korean society blocked the opportunities to reduced the damage of the famine. The authorities hid the situation and blocked external access, hindering appropriate aid that could be massive otherwise.[254]

Unlike in Africa, the food crisis in the DPRK is the structural problem that was caused by the ineffectiveness of socialist economy and the authorities' ignorance of relief efforts. The authorities avoided self-relief efforts and wasted money for military build-ups and political propaganda. If the authorities reduced only some percent of distorted resources, the food crisis could be resolved [1.5 billion dollar (3% of military costs) could buy 1 million MT of maize].[255]

This argument is not unique in the DPRK famine. In case of the 1932-33 Soviet famine, for instance, Stalin has been blamed to purposefully utilise the famine for the political purpose of the communists. Or at least the Soviet government failed to response the famine appropriately so that many victims who could have been saved lost their lives. Indeed the government still exported grains even while the famine hit the country, hid the real situation from both its people and outside world and did organise little relief programs.

Similar blames have been repeated for the DPRK government during its food crisis. For instance, it was criticised to hide the country's real food situation, block international food aid, provide food rations unevenly among social groups and make little efforts to reduce its military expenses to save famine victims.

Interestingly, however, there is other evidence suggesting that the DPRK government did not fail to response the food crisis appropriately. For instance, it increased its grain import from the early stage of the crisis, appealed for international food aid and opened the country to the aid agencies for the first time in its history. In particular, as far as food distribution is concerned, some argues that the government maintained a fairly egalitarian distribution rule during the food crisis.

Previous FAO/WFP assessments have indicated that Korea DPR faced a large cereal deficit and severe food supply problems in 1996. Perhaps the most important reason that there was no wide

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[253] Han Seung Hun (2000), P.11-12
[254] Han Seung Hun (2000), p.8-9
[255] ROK Ministry of Unification (Sep.1998)

> scale famine during the year, was an effective Public Distribution System, which ensured food, albeit at much reduced level, to the entire population. In Korea DPR the effects of food shortages have been uniformly spread over the population and the PDS has proven itself to be a highly effective channel for food assistance..... in particular rations for children were not lowered throughout the period[256]

In this respect it is controversial whether the food crisis was worsened or eased by the government responses. In other words, whether did the government do proper job to save the victims?

6.4.2.3. Who were the victims?

Perhaps the most interesting but controversial issue of the DPRK famine is who were the main victims. In most historical famines (food shortages) farm households usually appeared as the main victims. The famines also hit different regions unevenly. For instance, the victims of the 1932-33 Soviet famine came mostly from peasant class and Ukraine was the worst famine-stricken-area. And during the 1959-61 Chinese famine rural mortality rates were significantly higher than urban mortality rates. Similarly, many UN aid agencies, NGOs and researchers have believed that during the DPRK famine farm households, particularly in the southern part of the country, suffered relatively more.

> Emergency food assistance is especially needed for the farming community, who have no established access to the Public Distribution System, in addition to young children and pregnant and nursing mothers.[257]

> Vulnerable group initially lost their entitlement to food due to political decisions regarding rationing through the government-run Public Distribution System (PDS) rather than through markets forces....The main groups outside the PDS are the workers on state farms, who receive only 6 months' rations through the PDS, and workers on cooperative farms, who must depend on on-site production. This latter group has been borne the brunt of the losses that resulted from severe flooding and has been the main recipient of humanitarian assistance.[258]

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[256] FAO/WFP (6 Dec. 1996)
[257] FAO/WFP (22 Dec. 1995)
[258] Noland, Robinson and Wang (2001), p. 747

> For example areas visited by the mission in the north appear to be slightly better off nutritionally, than those in the South. This may be partly attributed to the fact that the northern provinces have more resources, such as timber, and access to China to barter for food... As a result food availability in southern areas is considered to have fallen more appreciably.[259]

But the problem is that the same or other UN aid agencies, NGOs and individual aid activists have reported that the famine was worst among urban population, particularly in the northern part of the country.

> David Morton [UN Humanitarian co-ordinator in the DPRK] said the WFP believed the largely mountainous northeast was hardest hit because its big industrial population had little or no work and little access to any other food. "They still have lot of people living in industrial cities and where industrial cities have been affected by fuel and energy shortages, the factory workers, peoples working in mines ... are particularly vulnerable".[260]

> The north eastern provinces of North Hamgyung and South Hamgyung are believed most affected by food shortages. Prior to 1995, they used to receive surpluses from North and South Hwanghae on the south west coast, but those surpluses have gone. The situation of these two provinces is exacerbated by the fact that they have large populations and contained the country's second and third largest cities (Hamhung and Chongjin).[261]

If this observation is correct, the DPRK famine is quite unique in the sense that it hit mainly urban population whose entitlement has been protected by state food rations.

However, it is still unknown and thus controversial who were the real victims of the famine.

6.4.3. Did and will the famine change agriculture?

The final but most important issue is whether and how the famine did and will change the DPRK agriculture. As discussed in previous chapters, the DPRK agricultural institutions have changed according to repeated food shortages. Hence it is natural to

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[259] FAO/WFP (3 June 1997)
[260] Reuters, N. Korean Famine Victims turn to alternative food, 7 May 1999

assume that the recent food crisis will also change the institutions. But the problem does not seem so simple.

During the food crisis, as briefly mentioned already, the DPRK government made various practical efforts to increase both grain production and people's food consumption. And the efforts were mostly to decentralise, liberalise and open agriculture. In this sense some argues that the crisis will eventually lead to market reform in agriculture.

> The crisis of food rationing and the shortages of consumer goods resulted in various social changes. Private food trading has increased, and due to the development of black market two-tier price system has been formed and social control has weakened. ... Although the DPRK authorities have denied market reforms and emphasised the maintenance of socialist system, the country has already gone under the market reform processes. The present situation that the authorities lost control over black market and so tolerated its natural growth is regarded as the first phase of market reform. Note that the economic reforms in China and Vietnam also started when the leadership admitted the pressures of changes from below... Compared with the pre-reform situation in China and Vietnam, the presently widespread market relations are more developed.[262]

At the same time, however, the government frequently announced that it would not tolerate any basic changes in its socialist agricultural structure, and did actually took actions when food situation improved temporarily.[263] In this sense some believes that the changes in the agriculture, which were made during the famine period, might not last longer and the authorities will adhere to existing socialist system.

> Nevertheless this changes in economic policies have been limited controlled by other factors....The growth of farmers' markets and the widespread black markets also do not mean the complete deviation from socialist production relation in the sense that the administrative management system is still in place in farmers' markets and state control still influences unofficial economy.... In particular, the newly adopted 'people's economic planning law' show that the DPRK still maintains the planned economy under state control.... In short, although the changes in the DPRK economic

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[261] OCHA, DPRK Humanitarian Situation Report: 15 Mar-15 April, 15 April 1999
[262] Kim Yeon Chul (1997)

policies in the 1990s had many differences from before, they should not be regarded as the fundamental changes in the basic economic lines.[264]

In this sense it is still not clear how the DPRK agricultural institutions have and will change during and after the food crisis.

6.5. Conclusion

In this chapter we have reviewed the recent food crisis in the DPRK and examined why the crisis has happened, particularly concerning the collapse of the country's agricultural strategy for grain production. We have also addressed three controversial issues surrounding the crisis. The discussion of this chapter can be summarised as follows.

1. The DPRK has faced food shortages since 1987. The shortages were particularly worse between 1994 and 1997 when the famine claim surrounding the country was widespread in outside world. In 1998-99 the shortages were reportedly improved slightly. But there is no evidence the country has overcome the shortages yet.

2. The drastic decline in grain production was the main immediate factor leading to the food shortages. Between 1987 and 1997 the DPRK grain production was almost quartered according to official announcements. Although outside estimates suggest that the actual degree of decline in the production during this period might be lower than the official announcements, it is undeniable that the production collapsed in the 1990s.

3. Between 1946 and 1987 the DPRK has employed an agricultural strategy to increase the quantitative volume of grain production. It entails five policies: 1) the expansion of sown area; 2) the transformation of crop composition into high-yield

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[263] When grain production improved significantly in 1998, for example, Kim Jon Il immediately ordered in February 199 the government to tightly controlled farmers' markets and enforce people to get back to their workplaces (ROK Ministry of Unification: 8 Oct. 1999)

grain items; 3) the maximisation of agricultural inputs; 4) the introduction of dense planting; 5) the establishment of agricultural practices to prevent the problems of dense planting. Due to the strategy the DPRK agriculture had managed to increase its grain production more than five times during that period.

4. However, the strategy has collapsed completed since 1987. Grain-sown area has fallen, the share of high-yield grain items has not increased (or even declined), and agricultural input supply has collapsed. Because the existing agricultural practices preventing the adverse effects of dense planting could not work properly due to the shortages of agricultural inputs, dense planting has also damaged grain yields. It was this collapse of the agricultural strategy that generated a drastic decline in grain production between 1987 and 1997.

5. With respect to the food shortages, particularly those since 1994, three controversial issues have been and can be addressed. 1) Did the shortages lead to a famine? If so, when? And how severe was it? 2) Were (was) the shortages (famine) different from the food shortages (famines) in other countries? Who were the victims? What was the main factor determining the victims-FAD and food distribution? How did the government respond? 3) Have the food shortages changed agriculture? And will they?

Each of the following three chapters will deal with one of the three issues addressed by this chapter separately. Chapter 7 considers the first issue, estimating the demographic impacts of the food shortages between 1994 and 1999. Chapter 8 examines the basic features of the shortages in detail, comparing them with those of other food shortages. And chapter 9 studies the changes of the DPRK agricultural institutions since 1987 and discusses the possibility and directions of the future changes.

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[264] Kim Keun Sik (1999)

VII. Estimation on the Demographic Impacts of the DPRK Food Crisis: 1994-99

7.1. Introduction

In this chapter we consider the first issue of the DPRK food crisis. Did it develop into famine? If it did, when? And how severe was the famine?

Common usage allows two distinctive definitions of famine.[265] One is that famine entails an extreme and general scarcity of food while the other defines it as widespread, unusually life-threatening, hunger. The basic difference between both definitions is that the latter does not require a contraction in the aggregate availability of food for famine to occur. Modern economics of famine has tended to follow the latter definition. This definition has proved quite useful not only in studying historically reported famine phenomena without significant food availability decline (FAD), but also in developing a general theory of famine.[266] In this chapter we follow this latter definition. This is however mainly for practical reasons.

In the debates over the DPRK food crisis, no opposition has been made against the fact that the country experienced a general scarcity of food at least in the mid /late 1990s. But there has been a great dispute over whether this scarcity of food resulted in significant demographic changes. In one extreme, official media in Pyongyang has claimed that despite the food crisis the country's demographic trend has not changed at all.[267] In other extreme, some NGOs have argued that more than three million people, which comprise around 15 percent of total population, died of hunger between 1995 and 1997 when the country's food situation was reportedly worst.[268] To put this dispute into context we begin by defining famine as life-threatening hunger.

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[265] Ravallion (1997), p.1205. For the general discussion of famine definition, see the chapter 1 of Devereux (1993)

[266] For the general aspects of modern economics of famine, see Sen (1977:1981:1993), Dreze and Sen (1989:1990:1991) and Dreze (1999).

[267] Pyongyang TV News, 5 October 1997, quoted by North Korean Policy Trend (1997 no.14 : p.26). And Pyongyang TV News, 13 November 1998, quoted by North Korean Policy Trend (1998 no.14: pp.42-43).

[268] KBSM (1998) and KSM(1999).

Undoubtedly this definition requires detailed demographic research in order to judge whether the DPRK food crisis led to a famine. Indeed there have been many attempts to assess the country's demographic loss during the food crisis. However, the attempts have produced seemingly irreconcilable estimation results that put the number of total famine deaths during the food crisis from more than three million to less than 300 thousand. In consequence, they have intensified the famine dispute rather than resolved it.

In this chapter we show that all the previous attempts have failed to produce reasonable estimates, because they stand on inappropriate data and unreasonable assumptions. We also point out that the only way to construct reasonable estimates is so far to use official DPRK population statistics. Using the official statistics we conduct our own estimation, suggesting that the food crisis claimed 688 thousand excess deaths from 1 January 1994 to 31 August 1999. This result will clarify that the crisis actually developed into famine. But it will also show that the famine was not such a great one as international media and some NGOs have reported.

This chapter is organised as follows. In section 7.2 we examine previous estimates about the DPRK's demographic loss during the food crisis and show that they are all unfounded. For an alternative to previous estimates, section 7.3 studies the possibility of utilising the official population statistics. We discuss the availability and reliability of the statistics as well as the time period our estimation should cover. In this discussion we prove that the DPRK faced a famine in 1994-98(9). Using the official statistics, section 7.4 estimates the demographic impact of the famine in terms of total number of excess deaths. And section 7.5 considers the demographic impact in regional perspectives. In this section we develop the concept of the relative regional population index, finding that the famine was the most severe in the north-eastern part of the country. Finally section 7.6 summarises the findings of this paper.

7.2. Previous Estimates

It is interesting to begin with existing estimates. Clearly the number of famine deaths has been central to the debates over the DPRK food crisis, and until recently most attempts to estimate that number have concluded that the crisis was one of the most tragic famines in human history in which around 3 million people perished of

starvation. To understand these attempts it helps to divide them into three groups according to their methods and data used. First, Eberstadt (2000) studied the DPRK population size implied by the number of delegates at the 1998 Supreme People's Assembly (SPA), concluding that 3 million people are missing between 1990 and 1998. Second, Natsios (1999) and Choi Euh Chul (1999) etc examined various information provided by the DPRK defectors, particularly that by Hwang Jang Yop, a former party ideologue of the DPRK, arguing that 2-3 million people died from hunger between 1995 and 1997. Third, Korean Buddhist Sharing Movement (KBSM) (1998), Korean Sharing Movement (KSM) (1999) and Robinson, Lee, Hill and Burnham (1999) collected household demographic data from the DPRK food refugees in China, showing that during the food crisis their death rates increased by at least 8 times more than normal.[269] As summarised by table 7-1, they differ greatly by estimation periods, methods and data used. Nevertheless, they all argued that the DPRK food crisis caused at least many millions of famine deaths.

Interestingly, however, the ROK government announced a quite different estimation result in 1999. The ROK National Statistical Office (1999) studied the information provided by the DPRK defectors, as many existing attempts did, but concluded that the number of famine deaths during the DPRK food crisis should be about 7-80,000 per year.[270] The figure is less than one tenth of what other estimates presented.

In addition, Goodkind and West (2001) recently argued that the existing estimates of famine deaths are 'best viewed as conjectures rather than reliable estimates', carrying out their estimation in a quite different way. They assumed that the DPRK experienced similar mortality increases during the food crisis to those of China during the Great Leap Forward, showing that famine deaths in the DPRK from 1995 to 2000 most likely numbered between 600,000 and 1 million.

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[269] Besides those mentioned in the text, many outside observers have made their own estimations. For instance, see Kirk (1998). However those estimations are either largely guesswork, depending on rumours and eyewitness, or quotations from other estimations, mainly those made from the DPRK food refugees' household data. Hence we do not consider those estimations that fail to clarify their estimation methods.

[270] In fact NSO (1999) is the result of co-works of many ROK government agencies, including National Security Planning Agency and Ministry of Unification. Its estimation results are known as largely dependent on two sources: the DPRK 1993 census data and the information provided by the DPRK defectors who had been previously engaged in public health sector. But it is not known how many defectors were engaged in the estimations and how their information was utilised.

Table 7-1. Estimations on the Demographic Impacts of the DPRK Food Crisis

	Data Used	Estimated Period	Normal Demographic Trend		Demographic Trend During The Food Crisis		Estimated Loss
			Population Growth rate (%)	Mortality (per 1000)	Population Growth rate (%)	Mortality (per 1000)	
KBSM	Household data of the DPRK food Refugees	1996-1997	-	-	-11.58	124.8	Total deaths, not excess deaths, in 1995-97: 3.5 million
Johns Hopkins Research Team	Household data of the DPRK food Refugees	1995-1997	1.5	5.5	-3.18	42.8	Death: 8 times more than normal Birth rate: half of normal
Eberstadt	Indirect Indicator (the 1998 SPA Election)	1998	the projected population of 1998 using 1987 data: 24 million		the population of 1998 implied by SPA election: 21 million		Total population loss: 3 million
The ROK Government	Defectors' Statements etc	1995-1998	1.27	8.8	0.58	12.1	Total excess deaths in 1995-98: 270,000 (7-80,000 per year in 1995-97 & 40,000 in 1998)
Goodkind and West	China's experience in the 1959-61 famine	1995-2000	-	5.5	-	8.7-13.6	Total excess deaths in 1995-2000: 605,000-1,040,000
Others	Information from the DPRK Defectors etc	various	-	-	-	-	At least a million famine deaths in a single year of 1996 etc.

Source) 1. For Korean Buddhist Sharing Movement, KBSM (1998)
2. For Johns Hopkins Research Team, Robinson, Lee, Hill and Burnham (1999)
3. For Eberstadt, Eberstadt (2000)
4. For Goodkind and West, Goodkind and West (2001)
5. For the ROK Government, National Statistical Office (1999)
5. For others, for instance, Choi Euh Chul (1999), Natsios (1999) and US Congress North Korean Research Group (1999) etc.

Both the ROK National Statistical Office (1999) and Goodkind and West (2001) cast doubt on the reliability of the exiting estimates arguing many millions of famine deaths. But are the ROK National Statistical Office (1999) and Goodkind and West (2001) reliable? In what follows we show that all the existing estimates, including the ROK National Statistical Office (1999) and Goodkind and West (2001), are ill-founded and thus unreliable.

Table 7-2. The DPRK Population Implied by Elections for Supreme People's Assembly (SPA): 1962-1998

Election Date	Delegates Elected	Implied Population (million)	Reported Population* (million)
Oct. 1962	383	11.49	11.41
Nov. 1967	457	13.71	13.25
Dec. 1972	541	16.23	15.15
Nov. 1977	579	17.37	16.45
Feb. 1982	615	18.45	17.77
Nov. 1986	655	19.65	19.06
Apr. 1990	687	20.61	-
Sep. 1998	687	20.61	-

* interpolated between actually reported years

Source) 1. For 1962-1990, Eberstadt and Banister (1992) p. 36
2. For 1998, Eberstadt (2000)

7.2.1. Estimates based on the number of delegates at SPA Election

Consider the estimates using the 1998 SPA election as an indicator for the DPRK population. Eberstadt (2000) pointed out that according to the DPRK constitution a delegate should be elected for every 30,000 population at SPA election. On this basis, he argued that the DPRK population in 1998 was not significantly different from that in 1990 because the SPA elections in both years elected the same number of delegates. By contrast, the population projection using the 1987 household

registration data suggests that total population should increase by around 3 millions between 1990 and 1998. He interpreted that those missing 3 millions reflected the size of demographic loss claimed by the food crisis.

Traditionally the number of delegates at SPA elections has been frequently used by many researchers to approximate the DPRK population size.[271] In particular, Eberstadt and Banister (1992) showed that the figures driven in this way had not made huge differences from actually reported population sizes until 1986. Hence one might assume that the 1998 population could be approximated in the same way. But the 1998 SPA election was carried out under a new election law, which deletes the article defining a delegate for every 30,000 population. The law simply states that the number of delegates should be decided proportionately to the population size, not referring any concrete rules.[272] This means that the population estimates made out of the number of delegates at 1998 SPA election results are in principle groundless. It is therefore difficult to accept that Eberstadt (2000) provides a reasonable estimate.

7.2.2. Estimates based on the DPRK defectors' statements

What about the estimates based on the DPRK defectors' statements? It is well known that many defectors had suffered immense food shortages and witnessed lots of famine deaths in the DPRK. It is however unlikely that they know the overall situation of the DPRK where the government has completely withdrawn any statistics from public since 1962 and controlled all population movement. In this respect their statements should be regarded as reflecting their own personal experiences largely affected by their locations and social statuses.

The problem is that the personal experiences of the defectors have proved too diverse to extract a general trend while their numbers are too little to control the diversity. Some say that they witnessed 2-3 neighbours dying from hunger every day while others report that there was no famine death where they lived. Due to this diversity the estimates based on their statements have produced seemingly

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[271] For instance, Bukhan Yonguso [Research Institute for North Korea], a ROK research institute, had made its own estimates on the DPRK population sizes using this technique until 1987 when the DPRK household registration data was first submitted to UN (Bukhan Yonguso, Bukhan Chongram [Encyclopaedic Information about North Korea]. various years)

[272] For the development of the DPRK election law, see Jang Myung Bong (1999)

unreasonable differences. For instance, Choi Euh Chul (1999) put the number of famine deaths between 1995 and 1998 as high as 3 millions while the ROK government estimates the same number as low as 300 thousands. By all means, these differences do not seem plausible.

An exception is the statement of Hwang Jang Yop. Unlike other defectors he had been entitled to accessing sensitive information in the DPRK as a party ideology secretary. Further he says that he heard about concrete death tolls during the food crisis from the persons who were dealing with official figures. He said:

> According to a person in organisation department in the party, 500,000 died of starvation in 1995, including 50,000 of party members, and in this year [1996] around 1 million people were dying from hunger....The secretary who was in charge of defence industry told a similar story. Of 500,000 workers in defence industry, even the death tolls of most skilled technicians who were regarded as the jewels of the country numbered 2,000. In addition, he said that more than half of workers could not go to their workplaces due to severe hunger, lying down at home.[273]

We would not challenge the truth of his statement. Nevertheless, we would argue for two reasons that it is unwise to use his statement.

First, it is difficult to accept the demographic implications of his statement. Lee Sam Sik (2000) shows that Hwang's statement should lead us to the conclusion that the DPRK life expectancy in the mid 1990s dropped to mere 21. Given that the 1993 DPRK life expectancy was 72, this figure means that the longevity of an average North Korean was cut by more than 70 percent for only two or three years. Further, if the figure is correct, the life expectancy in the DPRK should be far lower than even that in the poorest countries in the world such as Somalia (45.4), Sudan (55.0), Nepal (57.3) and Cambodia (53.4).[274] We do not believe that a country's living conditions could change so miserably in such a short space of time.

Second, Hwang's statement suggests that the DPRK government has provided fictional statistics to outside world. Hwang specifies his sources as the persons who make economic policies with official population statistics, but his statement can not be compatible with any official population figures the government has released since

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[273] Cho, Gap Je, "Figures tell: Statistical Analysis of 3 million famine deaths in North Korea" [in Korean], *Wolgan Chosun [Monthly Chosun]*, September 1999
[274] Lee Sam Sik (2000), p. 68

1993. As we shall see later, the government has reported that its population increased from 21.2 million in 1993 to 22 million between October 1995 and February 1996, and to 22.5 million on 31 August 1999. Given 500 thousand deaths in 1995 and 1 million deaths in 1996 by Hwang's statement, those official figures could not be produced with any reasonable birth rates. In order for his statement to stand, therefore, the DPRK government should have 'double bookkeeping system', providing outside world with fictional statistics that are totally different from what it has.

It is true that statistical manipulation did occur in many socialist countries.[275] Nevertheless it was not a common way for socialist governments to hide their shortfalls from outside world. Rather, they tended to stop providing statistics, changed the ways of collecting and announcing statistics, including transformation of absolute numbers into indexes, and make statistical definitions and base years obscure. These methods have been frequently used by the DPRK government, too.[276] But until present time there has been no evidence that the government has manipulated statistics only for the purpose of submission to outside world.[277] In this sense, if we use Hwang's statement, we would face a rather difficult question: we should reassess all the available official DPRK statistics and, given the lack of information for that assessment, we should eventually give up using the statistics at all. We do not believe that it is wise to study the DPRK, the most isolated country in the world, without any help of official statistics.

7.2.3. Estimates made from household data of the DPRK food refugees

Next we consider the estimates made from household demographic data provided by the DPRK food refugees in China. KBSM (1998), KSM (1999) and Robinson, Lee, Hill, and Burnham (1999) separately surveyed the refugees with regard to the deaths and births of their family members but commonly found that the refugee households have experienced abnormally high mortality and low fertility since 1994. On this basis, they argued that the DPRK suffered millions of demographic loss during the

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[275] Concerning the Soviet statistical manipulation, for instance, see Davis, Harrison, and Wheatcroft (1994) pp. 24-37

[276] See Appendix II of this thesis

[277] For the general discussion of the DPRK statistics, see Chung (1974: p. 169-1770) and its critique by Eberstadt (1999)

food crisis. Because their studies are based on real household data collected from lots of the DPRK families, their findings have been regarded as the most convincing evidence to support the existence of great famine in the DPRK. Indeed all the DPRK famine reports and arguments by international media and researchers have ultimately depended on those household data.[278]

Given little official data available, one might think that surveying the food refugees is the best alternative way to construct reasonable estimates for the country's demographic loss during the food crisis. But we would argue that such estimates are not reliable, because the data collected from the refugees should be inevitably biased regionally and socially, leading to huge estimation errors.

Table 7-3. Regional and Occupational Distribution of Food Refugees

(%)

	KBSM	KSM	Robinson etc	The DPRK
1. Regional Distribution				
North Hamgyung	59.60	57.80	78.00	10.04
South Hamgyung	20.00	22.90	12.00	13.31
Others	20.40	19.30	10.00	76.65
Total	100.00	100.00	100.00	100.00
2. Occupational Distribution				
Farmers	5.30	2.89	9.00	23.53*
Non-Farmers	71.70	87.02	68.95	76.47*
Others	23.00	10.09	22.05	-
Total	100.00	100.00	100.00	100.00*

* Occupational distribution of North and South Hamgyung

Source) 1. KBSM (1998), KSM (1999), Robinson, Lee, Hill and Burnham (1999)

2. For the DPRK, DPRK Central Bureau of Statistics (1995)

[278] The report of great famine in the DPRK first appeared in September 1997 when World Vision, a Christian aid organisation announced its survey results on North Korean food refugees that one in seven North Koreans starved to death during the food crisis. (Reuters 16 Sep 1997). But its survey results relied on only 33 respondents; hence there were many doubt about their reliability.
This situation took a new turn in December 1997 when KSBM (1998), a Buddhist aid organisation that operated with the largest scale for North Korean food refugees in China, began to conduct a similar surveys. KSBM (1998)'s survey results reinforced the argument that around 15-20 percent of total population in the DPRK perished from starvation between 1995and 1997. And such similar surveys as mentioned in the text followed to confirm KSBM (1998)'s survey results, which has dominated the DPRK famine reports by international media.

A common feature of the DPRK food refugees in China is that they have quite similar regional backgrounds: they came mostly from the north-eastern part of the country, North Hamgyung and South Hamgyung province. Hence, when we collect their household data, we must face a regionally biased sample. For instance, around 80 percent of respondents in KSBM (1998) and KSM (1999) were from North Hamgyung and South Hamgyung, and this ratio rose up to 90 percent in Robinson, Lee, Hill, and Burnham (1999). Then, what implications does this regionally biased sample have?

Table 7-4. Provincial Births and Deaths in the DPRK: 1993

	Births		Deaths	
	(per 1000)	(DPRK=100)	(per 1000)	(DPRK =100)
North Hamgyung	18.40	90	6.50	115
South Hamgyung	19.10	93	6.40	114
Chagang	21.00	102	5.80	103
North Pyongan	20.40	100	5.90	105
South Pyongan	20.50	100	5.40	96
Ryanggang	21.50	105	6.20	110
Nampo City	16.70	81	4.50	80
Kangwon	22.70	111	6.10	108
North Hwanghae	22.60	110	5.40	96
South Hwanghae	22.80	111	5.40	96
Kaesung City	21.00	102	5.70	101
Pyongyang City	20.20	99	4.40	78
The DPRK	20.49	100	5.63	100

Source) DPRK Central Bureau of Statistics (1995)

Table 7-4 presents provincial birth and death rates found by the 1993 DPRK population census. The DPRK government has announced that the census results show normal demographic trends in the country. Hence, the presented birth and death rates should be regarded as reflecting normal mortality and fertility trends. They show that North Hamgyung and South Hamgyung had the highest mortality and the lowest fertility rates in the country. For instance, crude death rate in North Hamgyung is higher by more than 40 percent than in South Hwanghae. The implication is clear: the sample data from the DPRK food refugees would lead to the overestimation of the country's deaths and the underestimation of its births even in normal years.

Table 7-5-A. Grain (Rice + Maize) Production in Hamgyung Provinces, 1993 –1997

(million MT)

	89-92*	93	94	95	96	97
North Hamgyung	0.44	0.22	0.25	0.22	0.14	0.11
South Hamgyung	0.90	0.57	0.71	0.36	0.23	0.11
Sub-total	1.34	0.79	0.96	0.58	0.37	0.22
(89-92 = 100)	(100)	(59)	(72)	(43)	(28)	(16)
DPRK total	8.38	8.69	6.66	3.37	2.24	2.58
(89-92 = 100)	(100)	(104)	(80)	(40)	(27)	(31)

* average production between 1989 and 1992

B. Per Capita Food Availability in Hamgyung Provinces, 1994 –1998

	Population of 1993 (million)	Grain (rice + maize) Production on annual average in 93-97 (million MT)	B/A (kg)
	(A)	(B)	
North Hamgyung	2.06	0.188	91
South Hamgyung	2.73	0.396	145
DPRK Total	21.21	4.708	222

Source) 1. For all production figures, DPRK's submission to DPRK/UNDP (1998a)

2. For the 1993 population, DPRK Central Bureau of Statistics (1995)

Furthermore, table 7-5-A and B show that North Hamgyung and South Hamgyung faced the worst food situation during the food crisis. In both provinces, grain production began to dramatically fall from 1993 a year before it did in other provinces. It was also both provinces that had the highest fall in grain production between 1993 and 1997. In consequence, they suffered the lowest food availability during the food crisis. Per capita grain production was mere 91kg in North Hamgyung on annual average between 1993 to 1997 while the national average reached 222kg. The former was even lower than the half of the latter. It is therefore not surprising to find that most food refugees came from North Hamgyung and South Hamgyung. Its implication is also clear: the sample data from the refugees are more likely to exaggerate the country's demographic loss during the food crisis.

It seems now apparent that the household data from the food refugees would not produce reasonable estimates for the country's demographic loss as a whole. Then, how about using them to estimate the loss of a certain region such as North Hamgyung or South Hamgyung? The answer seems also negative, because the refugees represent those who had the weakest entitlements even in their provinces.

Lets return to table 7-3, comparing the occupational distribution of the refugees with the overall occupational distribution in North Hamgyung and South Hamgyung. The data show that the share of jobless and non-farmer is much higher in the food refugees. It means that the refugees had weaker entitlements than their counterparts remaining in the country. Because all populations in the DPRK are provided food rations through their workplaces, those without job have in principle their rations suspended. Further, as discussed in the next chapter, non-farmers in the DPRK has tended to face more unstable food supply than farmers, particularly for the period of food shortages. Therefore, as the share of jobless and non-farmers increases in a population group, its entitlement in the DPRK should get weaker.

The fact that the refugees had relatively weaker entitlements is confirmed by table 7-6. The respondents of Robinson, Lee, Hill, and Burnham (1999) said that official food rations for their households averaged 30g per person per day by the end of 1997. According to official statistics, however, food supply for the residents in North Hamgyung and South Hamgyung, not including food aid, exceeded 440 grams

Table 7-6. Official Food Distribution in Hamgyung Provinces at the end of 1997

A. Farmer

	Annual Grain Allocation in Nov.97-Oct.98 (1000 MT)	Daily Grain Allocation at the end of 1997 (MT)	Population of 31 Aug. 1999 (thousand)	Daily Grain Allocation per farmer at the end of 1997 (gram)
	[1]	[2] = [1] / 365days	[3]	[4]= [2]/[3]
N.Hamgyung	79.6	218.1	490	445
S.Hamgyung	149.3	409.0	909	450

*Annual grain allocation includes food ration for farmer, seed and fodder

*Farm households receive their annual grain allocation at once shortly after harvest

B. Non-Farmer (PDS Population)

	Monthly Food Ration in Dec.1997 (1000 MT)	Daily Food Ration at the end of 1997 (MT)	Population of 31 Aug. 1999 (thousand)	Daily Food Ration per Non-Farmer at the end of 1997 (gram)
	[5]	[6] = [5] / 31days	[7]	[8]= [6]/[7]
N.Hamgyung	13.1	422.6	1737	243
S.Hamgyung	13.6	438.7	2023	217

*Food ration includes only grain supply for human consumption

*Non-farmers receive their food rations biweekly

C. Defectors' Daily Rations

Per Defector	30 grams at the end of 1997

Source) 1. For defectors' daily rations, Robinson, Lee, Hill and Burnham (1999)

2. For grain supply figures, the DPRK's submission to the DPRK/UNDP (1998a)

3. For farm and non-farm population on 31 Aug 1999, the DPRK's submission to FAO/WFP (8 Nov.1999)

per person per day for farmers and 210 grams for non-farmers at the end of 1997. The daily ration for an average refugee family was mere one seventh of the ration for an average non-farm household in South Hamgyung. This means that the refugee families are actually those who suffered most from food shortages even in North Hamgyung and South Hamgyung.

In sum, North Korean food refugees represent a population group who had the weakest entitlements in the region where the food crisis was most severe. In this sense we do not believe that their household data could produce any reasonable estimates for the DPRK demographic trends during the food crisis.

7.2.4. Estimates based on China's mortality experience in 1958-61

Finally consider the estimates of Goodkind and West (2001). In order to estimate the number of famine (excess) deaths in the DPRK from 1995 to 2000, they assumed that peak increases in mortality during the DPRK food crisis matched those of China during the Great Leap Forward, that is, the 1958-61 Chinese famine. Based on this assumption, they grafted the absolute increase in Chinese death rates from 1958 to 1961 onto the 1994 death rates in the DPRK, concluding that the number of famine deaths in the DPRK reached 1.04 million from 1995 to 2000. Then, they found that there is a linear relation between child malnutrition and infant mortality in most Asian countries. Hence they compared the 1998 DPRK children's nutritional data obtained by EU/FAO/WFP survey with those of other Asian countries and obtained another death rate figure of 8.7 per thousand during the DPRK food crisis. Because this figure was significantly lower than that driven by the peak death rate during the Chinese famine (13.6 per thousand), they scale-backed peak death rates directly calculated from China's experience and obtained another total famine death figure of 605,000 in the DPRK from 1995 to 2000. Using this figure they finally argued that the real number of famine deaths during the DPRK food crisis should number between 605,000 and 1.04 million.

As shall be discussed in section 7.4, these estimates are quite similar to our own estimates. Moreover, when there are no available official DPRK demographic data, such indirect information as other country's famine experience or other related

data like children's nutritional data might be the only alternatives to assess the demographic impact of the country's food crisis. Nonetheless, it is still questionable whether those estimates were reliable.

The reliability of the above estimates entirely depends on the assumption that the DPRK saw similar increases in mortality during its food crisis to those of China in 1958-61. To justify this assumption Goodkind and West (2001) emphasised the similarities between the DPRK food crisis (famine) and the Chinese famine. They wrote:

> Both famines resulted from a series of climatic calamities interacting with overzealous attempts to transform social institutions in line with Marxist ideals. Both famines persisted for several years because secretive governments were initially reluctant to admit the existence of adverse conditions and were opposed to relief efforts being undertaken earlier.

However, this argument is misleading. Consider the causation, pre-famine conditions and government's responses concerning both famines. Prior to famine, China had bumper harvests for several years. Together with overzealous political ambitions, those bumper harvests led to the launching of the radical commune movement at the final stage of agricultural collectivisation in 1958. This sudden institutional change resulted in successive grain production failures in 1959-61, eventually leading to the famine. Because the Chinese government was over-confident from pre-famine bumper harvests, when there were famine reports from rural areas shortly after the 1958 autumn harvest, it simply ignored them, still exporting grains to international market and making little efforts to alleviate the famine. By contrast, the DPRK had experienced on-going food shortages long before famine situation reportedly appeared in the mid 1990s. Hence, as shall be discussed in chapter 8, the government started to closely monitor the country's food situation and make various efforts to increase grain imports already from the late 1980s. In addition, there was no institutional change possibly leading to famine either. Note that agricultural cooperativisation in the DPRK was completed in the late 1950s. Moreover, when the food situation got worse in the mid 1990s, the government immediately appealed for international food aid and opened the country to westerners for the first time in its history in order to get the aid. Further, it implemented various reform policies to encourage private food production

and trade that had been prohibited for around four decades. In this sense we do not believe that the DPRK food crisis was similar to the 1958-61 Chinese famine.

In addition to this difference, there are two good reasons to believe that the DPRK's mortality trends during the food crisis might be different from those of China in 1958-61. One reason is that the main victims of the DPRK food crisis were different from those of the Chinese famine. In China, the famine was more severe in rural areas because urban population was protected by state food rations while agricultural population was not. By contrast, as we shall see in chapter 8, the DPRK food crisis was far more severe in urban areas, even though urban population is protected by state food ration as in China. Another reason is that the duration of the DPRK food crisis is much longer than that of the Chinese famine. In China, the famine lasted for around three years. In the DPRK, however, famine conditions reportedly continued at least for six years from 1995-1999. Taking into consideration of pre-famine food shortages, the duration of the food crisis is more than twelve years. We do not believe that two different famines with different victims and duration might bring about the same changes in mortality.

To sum, the DPRK food crisis was different from the Chinese famine in terms of: 1) causation; 2) pre-famine conditions; 3) government's response; 4) main victims and 5) duration. In this regard, it is difficult to accept that Goodkind and West (2001) directly applying China's experience to the DPRK provided reasonable estimates.

7.3. Official DPRK Demographic Statistics and Their Implications: The Existence and Duration of famine

So far we have seen that previous studies have failed to produce appropriate estimates for the number of famine deaths during the DPRK food crisis. A reason for this failure is that they have relied too much on non-official information. It is difficult and perhaps unwise to construct a country's demographic situation without official statistics, particularly when the country has been isolated from outside world for more than five decades. In this reason we utilise official DPRK population statistics to make our own estimation in the next section.

Before proceeding to the estimation, however, this section provides some preliminary discussions. We consider three questions. First, are the official statistics available? Second, are they reliable? Third, what should be the estimation period?

Note that in order to specify the estimation period we should first answer the questions of whether and when famine occurred in the DPRK. Indeed, using the official statistics this section show that the DPRK food crisis that started in 1987 developed into a famine in 1994, lasting at least until 1998.

7.3.1. Availability

Official DPRK population statistics are extremely hard to obtain. Since 1962 there have been only two cases that the government made its demographic data known to outside world. One case is that DPRK Central Bureau of Statistics (CSB) provided the 1987 household registration data to UNDP in November 1987.[279] Another case is that the same body submitted to UN the 1993 yearend census results in 1994.[280] Since then the government has made no detailed data available. Moreover, official media in Pyongyang has frequently claimed that despite the food crisis the country's population has grown at the official annual rate of 1.5 percent, the rate revealed by the 1993 census. Together with the lack of available data, this government's attitude has generated a perception among many researchers that it is impossible to study the country's demographic situation since 1993 using official data.

Interestingly however the government did provide outside world with some pieces of its population statistics between 1996 and 1999. And these statistics clearly show that the DPRK population was significantly influenced by the food crisis. In the first place the DPRK Ministry of Public Health made the country's updated child mortality figures known to US Centre for Disease Control and Prevention (USCDC) delegates in 1997.[281] It said that due to the food crisis child mortality under 5 increased six times to 31 per thousand in 1994 from 5.3 in 1993, and that the rate further rose up to 58 in 1996. Secondly, in September 1999 a high official in the DPRK Ministry of Foreign Affairs informed UN aid organisations in Pyongyang that crude death rate

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[279] The submitted data are available from Eberstadt and Banister (1992).
[280] DPRK Central Bureau of Statistics (1995)
[281] USCDC (1997).

Table 7-7. Officially Claimed Mortality Rates, 1987-1998

(per thousand)

	1987	1993	1994	1995	1996	1997	1998
Crude Death Rate	5	5.5	6.8	n.a	n.a	n.a	9.3
Under 5 infant Mortality Rate	-	5.36*	31	n.a	58	n.a	n.a

* under 5 deaths/under 5 yearend population

Source) 1. For 1987, Eberstadt and Banister (1992)
2. For 1993, DPRK Central Bureau of Statistics (1995)
3. For crude death rates in 1994 and 1998, Watts (1999)
4. For under 5 infant mortality rates in 1994 and 1996, USCDC (1997)

increased from 5.5 per thousand in 1993 to 6.8 in 1994, and to 9.3 in 1998.[282] Thirdly, in November 1999 the DPRK government provided FAO with its official population figures, which state that total population reached 22.5 million on 31 August 1999.[283] Given 21.2 million of total population at the end of 1993, the newly submitted figures suggest that the DPRK population grew by 1.09 percent on annual average between 1994 and 1999. Undoubtedly the rate is significantly lower than the official growth rate of 1.5 percent. Fourthly, prior to the submission of the 1999 population figures, the DPRK People's Service Commission that is in charge of food rationing gave its population figures between October 1995 and February 1996 to an US Agency for International Development (USAID) delegate who visited the country in September 1996.[284] Because the figures are not dated, it is difficult to calculate population growth rates by comparing them with the 1993 census data. Nevertheless they are of great importance in the sense that they show significant changes in regional population shares, suggesting that the severity of the food crisis varied greatly according to regions.

It is not clear why the DPRK government has maintained such mixed attitudes over the country's demographic situation since 1993: the denial of any demographic loss, on the one hand, but the submission of official statistics showing the loss, on the other hand. What is clear however is that it is not as difficult as generally conceived to examine the demographic impact of the DPRK food crisis using official statistics.

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[282] Watts (1999), p.1773
[283] FAO/WFP (8 November 1999)
[284] Lautze (1996)

Indeed we can estimate total demographic loss between 1994 and 1999 by comparing two reported population sizes dated of 31 December 1993 and of 31 August 1999. Combining the results of this estimation with official mortality rates available in some years, we can also examine the chronological development of the food crisis. It is equally possible to study the food crisis in regional perspectives using available regional population figures.

Table 7-8. Reported DPRK Populations: 1987-1999

(thousand)

	1987 *	1993 *	1995 **	31 Aug.1999
Special Cities				
Pyongyang	2,355	2,742	2,852	3,044
Kaesung	331	335	347	386
Nampo	715	731	760	814
North West				
S. Pyongan	2,653	2,867	2,981	3,100
N. Pyongan	2,408	2,437	2,501	2,625
Chagang	1,156	1,152	1,199	1,232
North East				
S.Hamgyung	2,547	2,732	2,842	2,932
N.Hamgyung	2,003	2,061	2,143	2,227
Ranggang	628	638	664	703
South West				
S.Hwanghae	1,914	2,011	2,092	2,290
N.Hwanghae	1,409	1,512	1,573	1,734
South East				
Kangwon	1,227	1,305	1,357	1,467
Military Population	-	691	753	757
Civilian Population	19,346	20,523	21317	21797
Total Population	-	21,214	22,070	22,554

Note) * yearend population
** population between August 1995 and March 1993, but not dated

Source) 1. For 1987, Eberstadt and Banister (1992)
2. For 1993, DPRK Central Bureau of Statistics (1995)
3. For 1995, Lautze (1996)
4. For 31 Aug 1999, DPRK's submission to WFP/FAO (8 Nov. 1999)

7.3.2. Reliability

The above official statistics provide a chance, the only chance so far, to estimate the demographic loss during the food crisis. But there are already some critiques over the reliability of those statistics. It seems therefore necessary to discuss the features of the available official statistics further before proceeding to the estimation. We consider two questions. First, have the DPRK government deliberately manipulated the statistics? Second, are they accurate even when they are not manipulated?

Consider the first question. Eberstadt (1999) found that there are inconsistencies among officially released mortality rates. As mentioned above, the DPRK Ministry of Public health reported that child mortality rate under 5 was 31 per thousand in 1994. Assuming that the mortality rates of other age groups did not change between 1993 and 1994, the change in child mortality should push up crude death rate to 8.5 per thousand in 1994. But the DPRK Ministry of Foreign Affairs announced that the rate was 6.8 in that year. Needless to say, it is highly unlikely that the mortality rates of other age groups fell under the deteriorating food situation in 1994. On this basis, Eberstadt (1999) argued that either officially released mortality figures were deliberately manipulated or they represented total failures of the DPRK statistical systems.

In addition, one might think that the population figures dated of 31 August 1999 were also manipulated. The figures were submitted in an effort to obtain food aid from UN. Apparently exaggerating population size would make the country's food situation more miserable and thus help get more aid from abroad.

We believe that these critiques are quite plausible. At the same time however we should point out that the counter-arguments could be equally plausible. Above all, the inconsistencies among officially released mortality rates could happen from the very character of the DPRK statistical systems. The DPRK population data have been collected through household registration system, a main purpose of which is to maintain the country's food rationing system. In normal years, population figures are calculated by the differences between reported births and deaths. When there is a birth (or death), the head of household should obtain birth (death) certificate from hospital,

have it stamped by local police station, and finally submit it to local food rationing body (via his workplace) in order to list (withdraw) the name of birth (death) on (from) rationing books.[285] Therefore three different administrative hierarchies have been engaged in collecting population statistics: Ministry of Public Health, Ministry of Interior, and People's Service Commission. This means that officially released population statistics could differ by their collection bodies and released timings due to both time-lags and intentional omissions in reporting. During the food crisis, for instance, households would prefer to delay or avoid reporting the deaths of family members particularly to local rationing bodies. In this sense, say, if the DPRK Ministry of Foreign Affairs quoted mortality data originated from People's Service Commission, the data could be inconsistent to child mortality data provided by Ministry of Public Health even when the government did not have any intention of statistical manipulation.

It is also possible to argue that the population figures dated of 31 August 1999 can not be severely manipulated for the same reason to obtain food aid from abroad. For exaggerating population should mean that the country had effectively survived even very low food availability, hence hindering its efforts to get more aid from abroad.

The problem is that there are no enough data/information to judge both competing arguments. Hence, though further studies needed on this issue, we simply assume that officially released population statistics since 1993 could be manipulated but the degree of manipulation might not be great.

Now consider whether the data are accurate even when they are not manipulated. In contrast to the first question, the answer to this second question seems quite straightforward: they are not necessarily accurate. There are two reasons. First, most population figures available since 1993 seem from People's Service Commission that tends to have the most exaggerated figures among the DPRK statistical collection bodies for the reasons mentioned above. Of course, the figures dated of 31 August 1999 are not labelled with any concrete source within the government. But they divide population into PDS population and non-PDS population by regions, showing that

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[285] Seo (1995), p. 35-47

they are made for rationing purpose by People's Service Commission. Second, as discussed above, the figures about crude death rates since 1993 seem to underestimate actual mortality trends.

This means that, when we use those available official statistics, we are likely to underestimate the demographic loss during the food crisis. In this sense we assume that our estimates, which will be presented in next section, provide the lower limit of possible reasonable estimates over the demographic loss.

7.3.3. Implications: the existence and duration of the DPRK famine

Finally consider some implications of the above statistics concerning the period for which we should estimate the demographic impacts of the DPRK food crisis. Undoubtedly establishing reasonable estimation period is important to have appropriate estimation results. In addition, it is of great importance in two other respects. First, it is related to the question of whether and when famine occurred in the DPRK. Second, it is also related to the main factor leading to the famine.

Until present time the DPRK government has claimed that its food crisis was caused by the great flood in 1995. Indeed it appealed for international food aid right after the flood, and consequently many demographic studies have implicitly assumed that the country went under famine situation in 1995 [see the estimation periods of previous studies in table 7-1]. But this implicit assumption of famine-starting year should be rejected from the official DPRK statistics. For they clearly suggest that the famine started in 1994. For the same reason the government's excuse for the food crisis, the 1995 flood, should be also rejected.

Let us first look at mortality rates. As mentioned above, child mortality rate under 5 jumped by six times already in 1994 and crude death rate also significantly increased in that year. Of course the increase in mortality could occur from various factors other than food shortage. But official grain production statistics show that the increase was the direct result of deteriorating food situation.

Now we return to table 5-A. The 1993 autumn harvest that determined the 1994 food situation was reasonably good, compared with the 1989-92 level: it increased by 4 percent. But the provincial harvests in both North Hamgyung and South Hamgyung were extremely poor in that year: they fell by more than 40 percent

reportedly due to cold weather. What should be noted is that, as discussed in chapter 4, the DPRK agriculture has been organised to achieve regional food self-sufficiency and thus its food rationing system has operated within each province since the early 1960s. It means that the 1993 poor harvests put immense food pressures on North Hamgyung and South Hamgyung in 1994.

Moreover, as mentioned in chapter 6, the government stopped all internal food deliveries to the northern part of the country in 1994 and shut down PDS in the region. As a result, many residents in North Hamgyung and South Hamgyung faced entitlement failures. According to the surveys of KBSM (1998), for instance, most food refugees from both provinces experienced temporal cessation of food rations and thus received only 60 percent of their rations in 1994.

In the introduction of this chapter we have defined famine as life-threatening hunger. And we now know three facts concerning the 1994 DPRK food situation: the sharp increase in mortality, dramatic (grain) production failures in some provinces and entitlement failures among some households in the same provinces. Given these facts and definition, it would not be difficult to conclude that famine occurred in the DPRK in 1994.

By the same analogy, we can see that the famine hit the whole nation at least until 1998. Both child mortality rate and crude death rate kept on rising until 1998, which was accompanied by grain production failures in national level and widespread entitlement failures among most households.

Yet it is not clear whether the famine lasted in 1999 and whether it has ended yet. There are no enough official data available while information and related data made by outside world provide quite different pictures. Nevertheless, we assume that the famine lasted at least in 1999. Because the latest available official population figures are dated of 31 August 1999, this assumption would save us from making another unnecessary assumptions in order to estimate the demographic impact of the famine.

7.4. Estimation on the Demographic Impacts of the DPRK Famine

In this section we estimated the number of total deaths in the DPRK for the period from 1 January 1994 to 31 August 1999 using official population statistics. We also estimate the hypothetical number of total deaths that would come out if there were no famine. The difference between those two numbers, that is, the number of excess deaths is presented as the genuine demographic impact of the DPRK famine.

7.4.1. Account Framework

Consider population changes between time 0 and t in a society where there is no immigration. Suppose that there is no change in death rate and birth rate over time. In this society, population changes must be determined solely by natural population increase rate, the difference between death rate and birth rate. Hence the population size at time t can be described as

$$P^t = (1+r)^t P^o = (1+b-m)^t P^o \quad (1)$$

[P^t: population at t, r: natural population increase rate, m: death rate, b: birth rate]

If deaths are evenly distributed between time i and i+1, the number of total deaths during that period is:

$$D^i = \tfrac{1}{2} [mP^i + mP^{i+1}]$$

$$= \tfrac{1}{2} mP^o [(1+b-m)^i + (1+b-m)^{i+1}] \quad (2)$$

where D^i is the number of total deaths between time i and i+1. Hence, total deaths between 0 and t can be expressed:

$$D = \sum_{0}^{t-1} \tfrac{1}{2} mP^o [(1+b-m)^i + (1+b-m)^{i+1}] \quad (3)$$

Equation (1) shows that, when we know death rate, birth rate, and population size at time 0, we can project population until time t when death rate and birth rate are constant. We can also forecast total deaths for that period according to equation (3). Conversely, when we know population size both at time 0 and at t, we can find death rate for that period given birth rate using equation (1). In this case we can also estimate total deaths using equation (3).

This result is quite useful to assess the size of demographic shock over time. Imagine that a demographic shock occurred in the society at time 0, affecting both death rate and birth rate until time t. Initial death rate and birth rate is given m^o and b^o respectively. In this case, if we know P^o and P^t, we can estimate total size of the demographic impacts caused by the shock, although we can not specify the impact on death rate and birth rate separately.

First, using P^o, m^o and b^o we can project population and then forecast total deaths until t under the assumption that there is no change in death rate and birth rate [equation (1) and (3)]. It gives a hypothetical total death figure that would come out, if there were no demographic shock.

Second, using P^o and P^t we can estimate the death rate reflecting the demographic impacts of the shock [equation (1)]. Of course, we do not know the real birth rate that has changed from b^o due to the shock: hence it is impossible to find the real death rate. However, we can simply assume that birth rate does not change from b^0 even after the shock. Under this assumption the whole demographic impacts of the shock, including those on birth rate, should reflect themselves in the change of death rate. Clearly the death rate driven in this way is not real death rate, but the rate reflecting total size of the demographic impacts caused by the shock

Third, once the death rate is obtained, we can conduct another population projection and produce another death toll figures [equation (1) and (3)].

Finally, we can calculate the difference between two death figures generated above. It is the difference that should indicate the genuine size of total demographic impacts caused by the shock.

Now look at the DPRK case. From the 1993 census data we have detailed information about the DPRK population size, death rate, birth rate at the end of 1993. The official population size of 31 August 1999 is also available. Moreover, we know that the DPRK famine started from 1994 and lasted until 1999. This means that we

can estimate total demographic impacts of the famine employing the same procedures as above. First, using the 1993 census population, birth rate and death rate we can project the DPRK population from 1 January 1994 to 31 August 1999 and forecast total deaths for that period. It will give a hypothetical death figure that would come out if there were no famine. Second, using the 1993 census population, the 31 August population and the 1993 census birth rate we can estimate the death rate reflecting the demographic impacts of the famine from 1 January 1994 to 31 August 1999. To do this, of course, we should assume that birth rate did not change during the famine period. Third, using the death rate driven in this way we can conduct another population projection and produce another total death figure. Finally, we can calculate the difference between two differently estimated total death figures and present it as the number of excess deaths (famine deaths), that is, the genuine size of the demographic impacts of the DPRK famine.

4.2. Method

The above framework is simple. But the estimation procedures it generates could be quite complicate, depending on the methods employed and the assumptions made. Here we employ the component method of population projection that is quite similar to that for UK national population projections.[286] The difference is that our method projects annual yearend populations while UK national population projections produce middle year populations every two years.

The component method is utilised for a projection of population by sex and age. Total population size is the result of this sub-population projection. To apply this method, therefore, we should know age(sex)-specific death rates and age(sex)-specific birth rates as well as initial age(sex) structure of population.

In general, under the assumption of no immigration, female population aged 1 or above at time t+1 can be described as

$$F_i^{t+1} = (1-q_{fi-1})\, F_{i-1}^{t}, \text{ for i is 1 or above} \qquad (4)$$

[F_i^t: female population aged i at t,

[286] For the details of this method, see Hinde (1998: p.205-217)

q_{fi}: q-type mortality rate for female population aged i]

Assuming that births are evenly distributed over time, the number of female births between t and t+1 is

$$B_{fm}^{t} = \frac{1}{2} [\Sigma b_{fi} F_i^{t} + \Sigma b_{fi} F_i^{t+1}] \quad (5)$$

[B_{fm}^{t}: female births between t and t+1,

b_{fi}: fertility rate of female population aged i for female births]

Because the probability that a female born between t and t+1 will die before t+1 is q_{f0}, female population age 0 at time t+1 should be

$$F_0^{t+1} = \frac{1}{2} (1-q_{f0})[\Sigma b_{fi} F_i^{t} + \Sigma b_{fi} F_i^{t+1}] \quad (6)$$

Repeating the same procedures for male population we will have

$$M_i^{t+1} = (1-q_{mi-1}) M_{i-1}^{t}, \text{ for i is 1 or above} \quad (7)$$

$$M_0^{t+1} = \frac{1}{2} (1-q_{m0}) [\Sigma b_{mi} F_i^{t} + \Sigma b_{mi} F_i^{t+1}] \quad (8)$$

[M_i^{t}: male population aged i, M_0^{t}: male population aged 0

q_{mi} : q-type mortality rate for male aged i

b_{mi} : fertility rate of female population aged i for male birth]

Undoubtedly total population at time t+1 is

$$P^{t+1} = F_0^{t+1} + F_i^{t+1} + M_0^{t+1} + M_i^{t+1} \quad (9)$$

The above equations provide the rationale for population projection using the component method. Given age-specific death rates, age-specific birth rates, and age

and sex structure of population at time t, the component method allows us to generate the population structure by sex and age at time t+1 [equation (4)–(8)]. Once the population structure is generated at time t+1, it is in turn used to generate the population structure at t+2; and this procedure could be repeated infinitely assuming that age-specific death rates and age-specific birth rates are constant over time. Because total population size is the simple sum of sub-population by age and sex, it is obtained as the natural result of the projection for population structure by age and sex [equation (9)].

Employing this component method we carry out our estimation as follows. In the first stage we project the DPRK yearend populations by sex and age from 1994 to 1998 and the population of 31 August 1999 using the age-specific death rates, the age-specific fertility rates, and the age and sex structure of population revealed by the 1993 census. From the projection we obtain annual and total death figures under normal trends. In the second stage we estimate the age-specific death rates reflecting the demographic impacts of the famine. To do this we set arbitrary age-specific death rates, replacing the 1993 age-specific death rates. Using the arbitrary rates we conduct the same population projection as in the first stage. If the projection produces the population figure of 31 August 1999 that is equal to the actually reported one, we recognise the arbitrary rates as the age-specific death rates correctly reflecting the demographic impacts of the famine. Otherwise we set another arbitrary rates, repeating the procedures. In the final stage we calculate the number of excess deaths using total death figures generated in the first and the second stage.

7.4.3. Assumptions

For actual estimation we make the following assumptions. They are necessary for the character of both our population projection and the data used.

Assumption 1> During the famine period age-specific fertility rates did not change from those revealed by the 1993 census.

As pointed out already, this assumption is necessary to calculate the average age-specific death rates reflecting the demographic impacts of the famine. Of course it is unrealistic.

Nonetheless, it could not make any difference as far as we are only concerned about the total size of the demographic impacts caused by the famine. Under this assumption any possible changes in fertility rates caused by the famine should express themselves in the form of changes in death rates.

Assumption 2> During the famine period age-specific death rates increased by the same degree, regardless of age and sex groups.

This means that there is no change in age and sex structures of mortality even while the mortality level goes up. In other words, the age-specific death rates during the famine period are expressed as

$$q_{mi}^{\ d} = \alpha q_{mi}^{\ c},\ q_{fi}^{\ d} = \alpha q_{fi}^{\ c} \text{ where } \alpha > 1$$

[$q_{mi}^{\ d}$: famine-period q-type mortality rate for male aged i,
$q_{fi}^{\ d}$: famine-period q-type mortality rate for female aged i,
$q_{mi}^{\ c}$: the 1993 census q-type mortality rate for male aged i,
$q_{fi}^{\ c}$: the 1993 census q-type mortality rate for female aged i]

This assumption seems also unrealistic because children, pregnant women and elderly are generally known more vulnerable to food shortages. Indeed there are many reports that the DPRK children and pregnant women faced greater health risks during the famine period than any other population groups. It has been however equally reported that they were the groups who were most protected both by international food aid and PDS. We do not have enough data to judge these competing reports. Hence, until further information is available, we assume that age and sex pattern of mortality did not change during the famine period.

Assumption 3> The famine did not have any demographic impacts on military population

This assumption is necessary due to the character of the data used. In the 1993 census all demographic statistics such as deaths rates and birth rates are driven from civilian population, not from total population. The number of military population is presented, but no information about the mortality and fertility relating to this group is given. Therefore the population projection using the 1993 census data should be the projection of civilian population, excluding military one. In other words, we do not consider military population in our estimation. According to the 1993 census, military population comprised for only 3.2 percent of total population. And the 31 August 1999 population statistics suggest that the share remained almost unchanged. In this respect we do not believe that the above assumption could bring huge differences to our estimation results.

With these three assumptions we transform the demographic equations (4)-(8) into the following estimation equations:

[Civilian Female population: Y]

$$Y_i^{t+1} = (1-\alpha q_{fi}^{c})\, Y_{i-1}^{t}, \text{ for i is 1 or above}$$

$$Y_0^{t+1} = \tfrac{1}{2}\,(1-\alpha q_{f0}^{c})[\Sigma\, b_{fi}^{c}\, Y_i^{t} + \Sigma\, b_{fi}^{c}\, Y_i^{t+1}]$$

[Civilian Male population: X]

$$X_i^{t+1} = (1-\alpha q_{mi}^{c})\, X_{i-1}^{t}, \text{ for i is 1 or above}$$

$$X_0^{t+1} = \tfrac{1}{2}\,(1-\alpha q_{m0}^{c})[\Sigma\, b_{mi}^{c}\, Y_i^{t} + \Sigma\, b_{mi}^{c} Y_i^{t+1}]$$

[Total Civilian Population: C]

$$C^{t+1} = Y_0^{t+1} + Y_i^{t+1} + X_0^{t+1} + X_i^{t+1}$$

[Y_i^t: civilian female population aged i at t, Y_0^t: civilian female population aged 0 at t

X_i^t: civilian male population aged i at t, X_0^t: civilian male population aged 0 at t

b_{fi}^c: the 1993 census fertility rate of female population aged i for female birth

b_{mi}^c: the 1993 census fertility rate of female population aged i for male births

C^t: total civilian population at t]

In the first stage of the estimation, we set $\alpha = 1$ in order to project population using the 1993 census data. We call this projection Estimation I. In the second stage, we set initially an arbitrary number for $\alpha > 1$, and keep changing the number until we find α that equalises the projected population of 31 August 1999 to the actually reported one. We call this projection Estimation II. The results of Estimation I and II are presented by Appendix I of this thesis.

7.4.4. Results

Table 9-A and 9-B summarise the estimation results. Estimation I suggests that, if there were no food crisis, the DPRK civilian population should have grown by 1.6 percent on annual average between 1994 and 1999; hence it should have reached 22.5 million on 31 August 1999. But estimation II shows that due to the famine population growth rate reduced to 1.06 percent for that period and consequently the civilian population of 31 August 1999 remained at 21.8 million.

Table 7-9-A. The DPRK Population: 1994-1999

(million)

		93	94	95	96	97	98	99.8.31
Est. I	Total	20.52	20.87	21.22	21.57	21.93	22.27	22.49
	male	9.68	9.85	10.03	10.21	10.39	10.56	10.67
	Female	10.84	11.02	11.19	11.37	11.54	11.71	11.82
Est. II	Total	20.52	20.73	20.96	21.19	21.42	21.64	21.79
	male	9.68	9.78	9.87	10.00	10.11	10.22	10.29
	female	10.84	10.95	11.07	11.19	11.31	11.42	11.49

* all yearend populations except for 99.8.31

Table 7-9-B. Demographic Impacts of the Food Crisis, 1994-1999

	94	95	96	97	98	99.8.31
Death (thousand)						
Est. I (A)	117	123	129	136	142	97
Est. II (B)	250	251	252	254	256	169
Excess Death (B-A)	133	128	123	118	114	72
Crude Death Rate (per 1000)						
Est. I (C)	5.6	5.8	6.0	6.2	6.4	6.5
Est. II (D)	12.1	12.0	11.9	11.9	11.9	11.6
D/C	2.16	2.07	1.98	1.92	1.86	1.78
Birth (thousand)						
Est. I (E)	462	475	484	487	483	316
Est. II (F)	462	474	483	486	481	315
E-F	0	-1	-1	-1	-2	-1
Life Expectancy						
Est. I (G)			72.58			
Est. II (H)			62.81			

Source) Appendix I

This decline in population growth rate was caused by increasing mortality. Between 1994 and 1999 age-specific death rates rose by more than two times on average ($\alpha = 2.15$), in comparison with those in 1993. In consequence, crude death rate increased from 5.5 per thousand in 1993 to 11.9 between 1994 and 1999. This means that there were around 114 thousand of excess deaths on annual average and 688 thousand in total during the famine period. Because we assume that there was no change in fertility, those death tolls should be regarded as total demographic loss caused by the famine.

Due to the increase in mortality the DPRK life expectancy fell to 63.81 during the famine period from 72.58 in 1993. Considering most Far East Asian countries have enjoyed more than 70 year of life expectancy, this figure shows that the living conditions in the DPRK dropped to the lowest level in the region. Form the above

results we can draw several interesting conclusions about the DPRK famine. First, 688 thousand excess deaths between 1994 and 1999 confirm that the DPRK food crisis that started in 1987 developed a famine in the mid/late 1990s. An interesting point is that this confirmation is driven from the official data provided by the DPRK government that has denied the existence of famine. It means that, whatever its stance at appearance has been, the government has actually known and effectively admitted the famine.

Second, the DPRK famine was not a great famine as claimed by many previous studies in which around 15 percent of total population perished from starvation. 688 thousand excess deaths might look a huge number. But this number is the sum of excess deaths for more than five years. During the famine period crude death rate increased only around twofold, which was roughly one tenth of KBSM (1998)'s estimate and one fourth of Robinson, Lee, Hill, and Burnham (1999)'s. Considering that total civilian population was 21.3 million on average between 1994 and 1999, annual excess deaths roughly comprised for 0.53 percent of total civilian population.

Third, the DPRK famine seems to reach the peak between 1995 and 1997. As mentioned already, the DPRK government announced that crude death rate was 6.8 per thousand in 1994 and 9.3 in 1998, both of which were significantly lower than 11.9 per thousand, the estimated average rate between 1994 and 1999. This means that the annual death rates between 1995 and 1997 should be much greater than the estimated average: hence the famine should be more severe for that period. Indeed many outside observers such as UN aid organisations and the delegates of NGOs in Pyongyang have reported that the DPRK food situation was particularly bad between 1995 and 1997 when successive natural disasters damaged domestic food production.

Fourth, the DPRK famine seems to last longer than any other famines reported in human history. In general, famine is distinguished from chronic food shortage for two aspects: 1) it is accompanied by a drastic increase in mortality; 2) its period is relatively short – months, a year, or some years. But the DPRK famine does not seem to fit both facts. The famine pushed up crude death rate only by around two times. Further, the period in which mortality increased lasted for more than five years; and we do not know whether it has ended yet. We believe that these two factors – relatively little increase in mortality and longer famine period- fundamentally

distinguish the DPRK famine from other famines. We will return to this point in the next chapter.

7.5. Assessment of the Demographic loss in regional Perspectives

In this section we consider the demographic impacts of the DPRK famine in regional perspectives. There are of course no regional death figures available since 1993. But the official population statistics of 31 August 1999 provide regional population figures: hence it is possible to follow up regional population changes during the famine period. On this basis, we discuss how severe the famine was by regions.

7.5.1. Idea

Table 10 reports provincial population shares in the DPRK between 1987 and 1999. An interesting point is that there were significant changes in the trends of regional population shares before and after 1993. For instance, the share of North East in total population rose from 26.77 percent in 1987 to 28.07 percent in 1993. But this trend was reversed between 1994 and 1999: the share fell up to 25.99 percent on 31 August 1999. By contrast, the share of South West that has slightly fallen between 1987 and 1993 significantly increased in 1999. This means that there were significant changes in the trends of regional population growth rates before and after 1993. Some might argue that these changes are not genuine because the population figures of 31 August 1999 include military population while other figures do not. However, when we use the population figures between August 1995 and February 1996, we can find similar changes after 1993. It seems therefore fair to say that the changes are genuine.

An interesting point is that those changes could be used as indicators for regional demographic losses caused by the famine. In general, the population size of a region can be expressed:

$$P_k^{t+1} = (1 + r_k + j_k + o_k)\, P_k^{t} = (1 + k_k) P_k^{t} \qquad (10)$$

[P_k^t: population of region k at time t, r_k: natural population increase rate of region k

j_k: inward migration rate of region k, o_k: inward migration rate of region k

k_k: population growth rate of region k]

It seems apparent that, when a severe food shortage hits a region, its population growth rate should fall because the shortage reduces both natural population increase and inward migration while accelerating outward migration. Of course, as shown by table 6, natural population increase rates differ greatly according to regions in the DPRK even in normal years. And there is no available information about regional migration rates. Hence it is difficult to use the absolute levels of regional population growth rates in order to study regional demographic losses during the famine period.

But this difficulty could be eased by normalising regional population growth rates with national (average) population growth rate. Consider the relative population growth index, β, which is defined as follows:

$$\beta_k = (1+ k_k)/(1+r) \qquad (11)$$

[r: national population growth rate, β_k: relative population index of region k]

If β_k is greater than 1, the region k sees more rapid population growth than the national average and vice versa. The interesting aspect of β however is not its level but its changing direction over time. Imagine that food shortage hit the region k harder than any other regions. Then, β_k is likely to fall because the natural population growth rate of the region would decline more rapidly than national population growth rate, and because its outward/inward migration would also accelerate/decelerate. By the same token, if the region proves relatively safer from the shortage, β_k is more likely to increase. During the famine period therefore the change of β_k could be used as an indicator to reflect the relative severity of the famine in the region k, compared with other regions.

It is quite simple to calculate β. In national level population growth is defined:

$$P^{t+1} = (1+ r)P^t \qquad (12)$$

Table 7-10. Provincial Population Share

(%)

	1987	1993	1995	31 Aug.1999
Special Cities	17.58	18.55	18.58	18.82
Pyongyang	12.17	13.36	13.38	13.50
Kaesung	1.71	1.63	1.63	1.71
Nampo	3.70	3.56	3.57	3.61
North West	32.14	31.45	31.35	30.85
S. Pyongan	13.71	13.95	13.99	13.74
N. Pyongan	12.45	11.88	11.74	11.64
Chagang	5.98	5.62	5.63	5.46
North East	26.77	28.07	26.51	25.99
S.Hamgyung	13.17	14.12	13.33	13.00
N.Hamgyung	10.35	10.04	10.06	9.87
Ranggang	3.25	3.11	3.12	3.12
South West	17.18	17.17	17.19	17.84
S.Hwanghae	9.89	9.80	9.81	10.15
N.Hwanghae	7.28	7.37	7.38	7.69
South East	6.34	6.36	6.37	6.50
Kangwon	6.34	6.36	6.37	6.50
DPRK Total	100	100	100	100

* DPRK total populations from 1987 to 1995 do not include military population and so represent total civilian populations while that of 31 Aug. 1999 include military population.

Source) Table 8

Dividing (10) with (12) gives

$$P_k^{t+1}/P^{t+1} = (1+k_k)P_k^t/(1+r)P^t$$

$$\therefore \beta_k = (P_k^{t+1}/P^{t+1})/(P_k^t/P^t) \qquad (13)$$

Hence we can calculate β only by the regional population shares between two different time points without any additional information.

7.5.2. Assessment

Table 11 presents β at each DPRK region for three different time periods: 1987-93, 1994-99, and 1994-95. Of them, the period of 1994-95 is taken into consideration only for the purpose to check the trends that the period of 1994-99 reveals. This is necessary because, as mentioned already, the provincial population statistics of 31 August 1999 include military population.

Table 7-11. Relative Population Growth Index (β), 1987-1999

	1987-93 (A)	1993-99 (B)	B/A (A=100)	1993-95 (C)	C/A (A=100)
Special Cities	1.055	1.014	96	1.001	95
Pyongyang	1.098	1.010	92	1.001	91
Kaesung	0.952	1.051	110	1.002	105
Nampo	0.964	1.013	105	1.002	104
North West	0.979	0.981	100	0.997	102
S. Pyongan	1.017	0.985	97	1.003	99
N. Pyongan	0.955	0.980	103	0.988	103
Chagang	0.940	0.973	103	1.002	107
North East	1.049	0.926	88	0.944	90
S.Hamgyung	1.073	0.921	86	0.944	88
N.Hamgyung	0.970	0.983	101	1.001	103
Ranggang	0.958	1.002	105	1.002	105
South West	1.000	1.039	104	1.001	100
S.Hwanghae	0.990	1.036	105	1.002	101
N.Hwanghae	1.012	1.043	103	1.001	99
South East	1.002	1.023	102	1.001	100
Kangwon	1.002	1.023	102	1.001	100
DPRK Total	1	1	100	1	100

* β = population share at time t/population share at time t+1.

Source) Table 7-9

Between 1987 and 1993 β is greater than 1 in Special Cities and North East, nearly 1 in South West and South East, and less than 1 in North West. It means that population grew faster in Special Cities and North East than national average. In contrast, the population growth of North West or other regions was similar to or greater than national average. The trends appeared similar between 1994 and 1999, except in North East where regional population growth rate turned out to be significantly lower than national average.

Now look at the changes of β before and after 1993. It is North East where β fell most after 1993. At provincial level South Hamgyung experienced the greatest decline in β. This means that North East, particularly South Hamgyung, suffered relatively negative population shocks since 1993. Special Cities also saw the fall in β. Except in Pyongyang, however, β increased significantly in all other Special Cities. Hence negative population shocks which hit Special Cities since 1993 mainly happened in Pyongyang. In contrast to North East and Pyongyang, other regions did not experience negative population shocks. They enjoyed either positive (in South East and in South West) or neutral (in North West) population shocks.[287]

From these results we can make the following conclusions. First, North East was the worst-famine-stricken area. Between 1987 and 1993 this region saw a rapid population growth with the rate far above than the national average. However, as the famine started in 1994, its population growth rate declined below the national average. This could happen only when its natural population increase rate fell more rapidly than the national average rate did during the famine period or outward/inward migration accelerated/decelerated. Whatever the cases were, they should be the results of the deteriorating food situation of the region in the sense that the region suffered the most dramatic food availability decline during the famine.

Second, Special Cities were relatively safe from the famine. At a first sight, this conclusion looks quite odd because β fell sharply in Special Cities since 1993. But such a fall mainly appeared in Pyongyang, the capital city, while other cities saw a significant increase in β. Moreover it is difficult to imagine that Pyongyang where

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[287] Note that population shocks here are defined in relative terms among regions. When a region has a positive shock, it should be interpreted as positive in comparison with other regions. Hence a country suffers an overall decline in its population growth rate, the decline could be still observed even in the regions with positive population shock in terms of β.

the DPRK elite classes reside was one of the worst-famine-stricken areas. The fall of β in Pyongyang therefore seems largely caused by the government's migration policies that encouraged Pyongyang residents to move outside the city. Indeed it has been frequently reported that the government has relocated mainly lower class Pyongyang residents to other cities and provinces since the early 1990s.[288] This suggests that despite the fall in β Pyongyang remained relatively safe from the famine. Combining this fact with the increasing β in other Special Cities, we conclude that Special Cities suffered the famine less than other regions did.

Third, the famine was more severe in the northern part of the country than in the southern part, in the eastern part than in the western part. Between 1994 and 1999 South West and South East commonly enjoyed positive population shocks (the increase in β) while their northern counter parts faced negative or neutral shocks. In addition, the positive shocks were greater in the western part than in the eastern part. At provincial level, South Hamgyung in North East and South Pyongan in North West faced relatively the most negative population shocks.

7.6. Conclusion

In this chapter we have discussed whether the DPRK food crisis developed into a famine and, if it did, when it happened and how severe the famine was. Concerning these issues we have made the following points clear.

1. To estimate the demographic impacts of the DPRK food crisis, previous studies have relied on non-official data and information such as the number of delegates at the 1998 SPA elections, defectors' statements and food refugees' household data. But these data and information are either inappropriate or unwise for being utilised for the estimation, and consequently previous studies have failed to reasonable estimates.

2. Previous studies about the DPRK food crisis have tended to support the view that the crisis was one of the most tragic famines in human history in which around 15

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[288] The ROK National Security Planning Agency, Pyongyang relocates poor, disabled, disloyal

percent of total population starved to deaths. Given that previous studies have proved unfounded, such an argument of great famine has also proved groundless.

3. It is a possible, and the only reasonable, way so far to utilise the official DPRK population statistics for estimating the demographic impacts of the food crisis. The official statistics suggest that the DPRK food crisis developed into a famine between 1994 and 1998. But there are no data and information enough to judge whether the famine lasted in 1999 and whether it has ended yet. In this chapter we have assumed that the famine lasted at least until 1999.

4. It is estimated that the famine claimed 688 thousand excess deaths from 1 January 1994 to 31 August 1999. On annual basis the number of excess deaths comprised 0.53 percent of total population. Undoubtedly the famine did not bring about huge population loss as many other historical famines did. But its period lasted longer than any other historical famines. Both the relatively small population loss and the prolonged famine period constituted two basic features of the DPRK famine.

5. In regional perspectives, the famine was more severe in the northern part of the country than in the southern part, in the eastern part than in the western part. This means that North East, including North Hamgyung and South Hamgyung, was the worst famine stricken area. By contrast, South West appeared as the relatively safest region from the famine.

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residents out of the city, 16 May 1997

VIII. FAD, Entitlement and the DPRK Famine

8.1. Introduction

This chapter examines the main features of the DPRK famine. In chapter 6 we have seen that there are three fundamental disputes over this issue. First, whether was it a FAD famine or not? In other words, what was the causation of the famine - FAD or distribution failure? Second, who were the main victims- farm households or urban industrial population? Third, were there policy failures? Did the government properly respond to the famine? Was it so-called 'controlled famine' in which the government politically chose the victims?

This chapter attempts to provide these disputes with the answers that available data allow us to give. To do this, however, we do not discuss the disputes directly. Instead, we study the causation, development process and basic features of the famine within the framework of modern economics of famine. Our answers to the existing disputes are given indirectly in the form of by-products of this study.

In this chapter we will show that the DPRK famine was a typical FAD famine but, apart from that, it was unique in all other aspects. It happened with the absolute shortage of food: hence there were no feasible policies to prevent it. It hit mainly urban population whose entitlement is protected by state food ration. Thus, the government was far more sensitive to the famine than any other socialist governments were to their historical famines. This sensitivity led to national coping strategies initiated by the government, eventually making the social impacts of the famine unique. That is, despite the unprecedented degree of FAD the famine did not cause a massive population loss. Instead, it imposed serious long-term health risks on the whole population. The most distinctive feature of the DPRK famine was that the victims got gradually but persistently weaker for a long space of time rather than perished away for a relatively short period of shocks, due to the mixed results of great food shortage and national coping strategies. In this respect 'famine-in-slow motion', the terminology used by UN, is the most appropriate to describe the famine.

The remaining parts of this chapter are organised as follows. In section 8.2 we show that FAD was the causation of the DPRK famine, examining how it influenced

the development of the famine and the selection of the victims. Section 8.3 identifies two basic features of the famine that can not be explained by FAD: urban famine and 'famine-in-slow motion'. To understand both features section 8.4 studies the DPRK entitlement system, finding the reasons why urban population was more vulnerable to the famine. Section 8.5 applies the DPRK entitlement system to the issue of policy mistakes during the famine period. In this section we show that not only did the DPRK government make few policy mistakes but also develop systematic national coping strategies to alleviate the famine. And these strategies are presented as the main immediate factor resulting in 'famine-in slow motion' in the DPRK. Finally section 8.6 summarises the findings of this paper.

8.2. FAD and the Causation of the DPRK Famine

We begin with the causation of the famine. Was it caused by FAD or distribution failure? Our answer is simple and clear: the famine was a FAD famine in all respects. It was pre-dated and triggered by FAD. Its geographical movement was determined by ups and downs of regional food production. The regional distribution of famine victims corresponded to the differences in regional food availability. And there were no feasible policies to prevent the famine given the level of FAD in the mid/late 1990s.

In this section we do not discuss the possibility of food distribution failure. But the section 8.5 will show that such a failure is unlikely to have happened during the famine period.

8.2.1. Constructing a DPRK Food Supply Table

It is not as difficult as generally assumed to construct reasonable estimates, though not entirely precise ones, for total food supply in the DPRK as far as its famine period is concerned. Food supply consists of production, import and any withdrawal from accumulated stocks.

Consider production. There are three sources for official grain statistics. First, Pyongyang media has regularly announced the country's grain production since

1990.[289] Second, in 1998 the DPRK Agricultural Commission submitted to UNDP its official figures for annual rice and maize production from 1989 to 1997.[290] Third, FAO has effectively published official DPRK statistics since 1991. The DPRK has been a member country of FAO since 1977. But FAO statistics for the DPRK grain production differed greatly from official announcements until 1990. In addition, FAO made it clear by the footnotes of FAO Production Yearbook that its statistics were not official figures but its own estimates. As shown by table 8-1, however, FAO has published the same figures as the official DPRK statistics submitted to UNDP since 1991. The difference in rice in terms of milled equivalent is simply because FAO has been applying different milling rates to convert paddy rice into milled equivalent. Furthermore, the footnotes of FAO Production Yearbook saying that FAO statistics were its own estimates have disappeared since 1991. It implies that FAO statistics have effectively provided official DPRK statistics at least since 1991.

Of these statistics, Pyongyang media figures may not be appropriate to identify the levels of grain production. The figures have been presented in the name of *algok* [grain] the definition of which was formerly vague, has changed several times and is not currently known.[291] More importantly, since annually released *algok* figures have been frequently subject to revisions, there is an inconsistency problem in the data.

But there are no such problems in the statistics submitted to UNDP and those published by FAO. In particular, the statistics transmitted to UNDP are quite distinctive in several respects. Firstly, they are time series data with the longest time period ever released in one occasion. Secondly, they are presented with clear definitions fitted to international standards. Thirdly, they provide provincial production figures that had been hardly released since the early 1950s.

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[289] Pyongyang media figures are compiled by a Japanese researcher (Hirata: 1998) who also obtained the confirmation of the figures from a high ranked DPRK official.
[290] These figures were presented at "Thematic Round Table Meeting on Agricultural Recovery and Environmental Protection For the Democratic People's Republic of Korea (DPRK)" that was held in Geneva on 28-29 May 1998 with the co-hosts of the DPRK and UNDP (DPRK/UNDP: 1998a)

Table 8-1. Official DPRK Grain Production Statistics by Sources

(million MT)

	Pyongyang Media Announcement: grain total	The DPRK Agricultural Commission			Official DPRK statistics published by FAO			
		Rice (paddy)	(milled)	maize	Rice (paddy)	(milled)	maize	grain total
1989	N.A	4.32	(3.24)	4.34	N.A	N.A	N.A	N.A
1990	9	4.48	(3.36)	3.9	N.A	N.A	N.A	N.A
1991	8.9	4.09	(3.07)	4.2	4.12	2.75	4.20	7.46
1992	8.8	4.45	(3.34)	3.72	4.50	3.00	3.72	7.18
1993	9	4.75	(3.56)	3.94	4.79	3.19	3.94	7.54
1994	7.1	3.11	(2.18)	3.55	3.18	2.12	3.55	6.16
1995	3.5	2	(1.40)	1.37	2.02	1.34	1.37	3.12
1996	2.5	1.41	(0.99)	0.83	1.43	0.95	0.83	2.12
1997	2.7	1.57	(1.10)	1.01	1.53	1.02	1.01	2.36

Source: 1. For Pyongyang media announcement, Hirata(1998)

2. For the DPRK Agricultural Commission, DPRK/UNDP(1998a)

3. For the statistics published by FAO, FAO statistical Database

The statistics submitted to UNDP do not provide total grain production figures. But this difficulty can be avoided by aggregating the statistics published by FAO. In sum, we have relatively detailed and clearly defined official grain statistics for 1991-97.

How about the reliability of the statistics? Some might think that the statistics are deliberately manipulated and so unreliable. Indeed there are many reasons to believe that the 1989-94 statistics exaggerate real outputs.[292] Nevertheless, the statistics since 1995 can be regarded as relatively reliable for two reasons. First, the motives for statistical exaggeration have vanished since the country began to receive international food aid in 1995. Surely such exaggeration would undermine the country's efforts to have more international food aid. Second, it is unlikely that the

[291] For details, see Appendix II of this thesis
[292] see Appendix II

government could deliberately underestimate its grain production given that FAO and WFP mission teams have regularly

Table 8-2. DPRK Grain Trade Statistics by Sources

(1000 MT)

		1991	1992	1993	1994	1995	1996	1997	1998
FAO	Import	1571	1154	1585	573	1010	1107	1451	1501
	Export	11	5	42	19	1	1	1	0
	Net Import	1560	1149	1544	555	1009	1106	1451	1501
USDA	Total import	1260	924	1350	401	894	969	n.a	n.a

Source: 1. For FAO figures, FAO Statistical Database

2. For USDA figures, Kim Lee and Sumner (1999), p. 531

visited the country, estimated the production and monitored official statistics since 1995.

In addition, though the 1989-94 statistics may be inflated, their trends, not levels, should be regarded as genuine. For both the DPRK agricultural structure and its statistical institutions had not changed until the mid 1990s so that the factors that might lead to statistical exaggeration would similarly affect statistics of different years. Indeed, as far as production trends are concerned, most outside estimates have great similarities with the official statistics.[293]

To conclude, the official statistics seem reliable since 1995 in terms of their absolute levels. In terms of their trends, the statistics seem reliable not only since 1995 but also before 1994. In this respect it would not be so dangerous, if necessary precautions are taken, to estimate the country's food production using the official statistics in 1991-97.

Now let us turn to (net) food import. Unlike in production there are no available official statistics. But international trade is one of few economic areas where outside researchers could have relatively accurate knowledge about the DPRK's real performance without official statistics. It is because there are so-called mirror

statistics, the statistics of trading partners. In case of the DPRK food trade, mirror statistics are available in three different forms. First, IMF Direction of Trade and its magnetic data have reported the DPRK transactions by partner countries and by items, including food items. Second, the US Department of Agriculture (USDA) has estimated the DPRK grain trade reportedly by aggregating its main trading partners' statistics. Third, FAO has provided its own statistics by aggregating the submitted trade statistics by its member countries.[294]

Of those statistics, FAO estimates seem to serve best for the study of the DPRK famine. IMF trade statistics have not included non-commercial trade such as food aid: hence they are of no great use for the DPRK food trade since 1995 when food aid accounted for up to 58 percent of its grain import [see table 8-19]. Both FAO and USDA estimates do include food aid. As shown by table 8-2, however, FAO estimates are greater than USDA estimates for all relevant years. Because the estimates using the statistics of trading partners are more likely to underestimate real trade volumes, it would be safer to use the estimates with greater values.

What about food stock? No official statistics are available again. Nonetheless, a variety of evidence suggests that the country's food stock was extremely small at least in the mid and late 1990s: hence the food supply from the stock was negligible. First of all, the DPRK government reported to FAO/WFP mission team that the country had faced the depletion of food stocks by 1995.[295] Secondly, consistent with this reporting, it has been observed that even military population and special security forces had their rations dramatically reduced from 1996, being encouraged to cultivate land for their own consumption.[296] Thirdly, it was frequently reported that a part of

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[293] Appendix II presents and discusses six outside estimates that provide alternative (estimated) statistics about the DPRK grain production from the 1980s to the 1990s. Noland, Robinson and Wang (1999:2001) also provide some outside estimates on the DPRK grain production in the 1990s.

[294] As Noland, Robinson and Wang (1999) pointed out, mirror statistics entail a certain degree of uncertainty. Some countries may not produce reliable official statistics; and some transactions such as border trade at personal level may not be even reported to the authorities. Hence it would be unwise to assume that mirror statistics produce precise estimates about the DPRK trade. Interestingly, however, Eberstadt (1998) showed that the estimates using IMF trade statistics produce the similar figures about the DPRK food trade in 1985-95 to those generated by FAO and USDA statistics. Muruoka (1995) who estimated the DPRK food trade in 1983-87 by aggregating its main trading partners' statistics also reached the similar figures to FAO statistics. It means that, although mirror statistics have a certain degree of uncertainty, they can still be a good indicator of the DPRK trade.

[295] FAO/WFP (22 Dec.1995)

[296] In February 1995 the DPRK government allowed military personnel and their families to have and cultivate private plots with the maximum of 40 m^2 for soldier and 100 m^2 for his family. In return, the government reduced daily ration for military personnel to 650 gram from 800 in May 1996. For

international food aid was diverted for military purposes. For instance, the canned meats that an American church donated were found in a DPRK military submarine that sank in the ROK territory of East Sea.[297] And Kim Dong Su, a former DPRK diplomat in FAO, stated that the government was diverting a part of international food aid for military stockpiling.[298] Though paradoxical, these reports suggest that the country faced food shortages even for military purposes during the famine period.

Table 8-3. Total Food Supply in the DPRK: 1992-1998

(million MT)

	Production	Net Import (FAO figures)	Total food Supply	
			total	(1993=100)
1992	7.46	1.15	8.61	99
1993	7.18	1.54	8.73	100
1994	7.54	0.56	8.10	93
1995	6.16	1.01	7.17	82
1996	3.12	1.11	4.22	48
1997	2.12	1.45	3.57	41
1998	2.36	1.50	3.86	44

* production figures are previous year's ones.

** total food supply = production + net Import, not including grain reserves.

Source: Table 8-1 and 8-2

Of course, we would not argue that the DPRK had depleted its food stock completely. It would be unwise to assume that the country that has militarily confronted with the ROK and the US for more than five decades had no military food reserves. Nevertheless, what the above evidence suggests is that during the famine

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instance, a North Korean soldier who was sent to South Korean area for a secret military campaign but caught by South Korean army stated that "in case of navy daily, ration reduced from 800 to 650 gram by 150 gram from May 1996, and they eat grain-soup in the evening with less physical activities" (Oh Gyung Chan 1997: p. 142).

[297] Chosun Daily News, 17 October 1997

period the country's food stock might hit such a level that the government regarded as minimal for the survival of the country politically and militarily. Hence the existing stock might not be available for economic planners to use for current economic and social purposes.[299]

Given such limited stock, food supply should be determined by the size of production and import about which there are relatively reliable statistics. In this regard it is not impossible to follow up the DPRK food supply, at least during the famine period, in reasonable manners.

8.2.2. FAD during the DPRK Famine

Table 8-3 presents total food availability in the DPRK before and during the famine period. As we would expect, total food supply began to fall sharply when the famine started in 1994. In particular, it almost collapsed in 1997 and 1998. In 1997, for instance, total food supply dropped to mere 3.6 million MT, less than half of 8.7 million MT in 1993.

Ongoing production failures are the main factor that led to a drastic decline in total food supply. Grain production declined for three consecutive years from 1994 to 1996 by more than 30 percent on annual average, reaching 2.1 million MT in 1996, one of the worst annual harvests in the DPRK history. It was less than one third of the

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[298] North Korean Policy Trend (1998, No.4), p.49

[299] The ROK and US intelligence agencies estimated that in the mid 1990s the DPRK had the food reserves ranging from 1 million to 1.5 million MT, which allowed the DPRK's offensive military operations against ROK for three or four months (Niksh, 1997). And the ROK government frequently criticised that the DPRK government did not use these reserves to save famine victims and instead tried to have more international food aid (Yonhap News Agency, 6 Jan 1996: Nihon Keizai, 9 Jan. 1996), although some other sources report that the DPRK did use military food reserves to provide food rations for some northern provinces (Joongang Daily News, 30 May 1996). It is of course unknown how much (military) food reserve the DPRK had during the famine period and how much food was withdrawn from the reserve to save famine victims. What is at least clear however is that the outside estimates of 1-1.5 million MT in the mid 1990s is much less than the reported food stock of 4 million MT in 1990 (FAO/WFP: 22 Dec 1995). This suggests that the country's (military) food stock declined rapidly during the famine period and this decline might be due to the withdrawn of food for the supply of civilian rations, as claimed by the DPRK government. It also suggests that 1-1.5 million MT of (military) food stock was nearly or below minimal (military) stock requirement that the DPRK government considered as 'minimal'. For, if not, the government would not take risks to divert international food aid for military purposes and so face the cessation of the aid from many donor countries. Indeed the ROK president Kim Yong Sam openly criticised in June 1996 that most of the 150,000 MT of rice ROK donated had been delivered to military, announcing the cessation of any subsequent food donation. And similar warnings have been repeated until this time. For instance, see the US General Accounting Office (1999).

1993 production, being quite similar to the production of the mid 1940s when the DPRK was first officially established.[300]

In contrast, grain import remained stable at high level through the 1990s. The country imported 1.1 million MT of grain on annual average in 1992-97, which was roughly five times the average in the mid 1980s. The only exception was 1994 when the import suddenly fell by more than 60 percent. But it soon recovered to 1 million MT in 1995 and subsequently increased as international food aid poured into the country. It shows that the import did not adversely affect total food supply during the famine period although the collapse of the country's import capabilities has been widely blamed for exacerbating the famine.

The fact that food supply fell by more than half in the mid/late 1990s suggests that the DPRK famine was a typical FAD famine. Undoubtedly such a massive FAD would generate famine conditions in any other country. It would be particularly the case in the DPRK where the population had been already suffering serious food shortages long before the dramatic FAD was realised.

Some might argue that the data presented here exaggerate the degree of FAD during the famine period because the 1991-94 production figures are inflated. Perhaps it is true. But the severity of FAD during the famine period is still paramount.

Table 8-4 compares total food supply in the DPRK with those in other socialist countries during their famine periods. Although some disputes remain unresolved, the 1959-61 Chinese famine and the 1932-33 Soviet famine are generally accepted as two of the worst famines in human history in which many millions died of hunger. In addition, both famines have a common feature that they occurred with significant FAD.[301]

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[300] As discussed in Chapter 3, the DPRK appeared in history with a great food shortage in 1945-46. And its grain production significantly stagnated to 1.9 million MT in 1946 and 2.1 million in 1947 from 2.4 million in 1944. Except these two years, the 1997 production is the worst annual harvest in the entire DPRK history.

[301] For FAD in the 1959-61 Chinese famine, see Nolan (1993). For FAD in the 1932-33 Soviet famine, see Wheatcroft and Davies (1999) and Wheatcroft, Tauger and Davies (1995)

Table 8-4. Comparison of Food Availability in Three Socialist Famines

The 1994-99 DPRK Famine					The 1959-61 Chinese Famine					The 1932-33 Soviet Famine				
Year	Total (mil. MT) (1)	(1993=100) (2)	Population (million) (3)	Per head (kg) (1)/(3)	Year	Total (mil. MT) (5)	(1958=100) (6)	Population (million) (7)	per head (kg) (5)/(7)	Year	Total (mil. MT) (9)	(1928=100) (10)	Population (million) (11)	per head (kg) (9)/(11)
1992	8.61	99		406	1957	194.70	98	646	301	1927	61.99	98	149	416
1993	8.73	100		412	1958	199.40	100	659	303	1928	63.00	100	152	414
1994	8.10	93	21.21 million	382	1959	165.80	83	672	247	1929	61.87	98	155	399
1995	7.17	82	at the end of	338	1960	140.80	71	662	213	1930	62.28	99	157	397
1996	4.22	48	1993	199	1961	152.00	76	658	231	1931	54.98	87	160	344
1997	3.57	41		168	1962	163.90	82	672	244	1932	51.46	82	162	318
1998	3.86	44		182	1963	174.50	88	691	253	1933	63.33	101	163	389

Source: 1) col.1: From table 8-3
2) col.3: the DPRK Central Statistical Bureau (1995)
3) col. 5, 7: Chang and Wen (1997), p 6-11
4) col. 9: low estimates of Wheatcroft and Davies (1999)
5) col.11: ADK's estimates, Wheatcroft, Harrison and Davies (1998) pp.274-275

Suppose that the 1992-95 DPRK figures are inflated and therefore it is impossible to identify the precise degree of FAD during its famine period. Even so, the figures are striking. They suggest that the DPRK population suffered far more severe food shortages than their counterparts in China and the Soviet Union during their famine periods. In the DPRK, per capita food supply dropped to 168 kg in 1997. By contrast, when the famine reached the peak in China in 1960, per capita food supply was 213 kg. And the figure was 318 kg in the Soviet Union in 1932. It means that the DPRK faced far lower food availability than China and the Soviet Union during their famine periods. Moreover, this extremely low food availability lasted for a long period in the DPRK. Per capita food supply in the DPRK went down below 200kg for three years between 1996 and 1998. For this period the DPRK population faced far lower food availability than their counterparts in China and the Soviet Union did in the peaks of their famines. It seems therefore clear that the stress caused by food shortages was much greater in the DPRK than in China and the Soviet Union.

We have pointed out that, even if the official DPRK grain statistics are inflated for the early 1990s, their trends should be regarded as genuine. It means that the low food availability in 1996-98 was the result of ongoing FAD since the early 1990s. Combining this fact with the severity of the stress caused by food shortages in 1996-98, we can conclude that the degree of FAD during the DPRK famine period was unprecedented in human famine history.

8.2.3. FAD, the Origin and Geographical Movement of the Famine

A distinctive feature of the DPRK famine is that there are clear links between FAD and the origin of famine. One might assume that, when a famine takes place with FAD, the latter should be the causation of the former. But the history shows that the story is not always so simple.

In the case of the 1959-61 Chinese famine, for instance, famine victims began to appear in late 1958 when the country had bumper harvest.[302] Of course, grain production drastically fell between 1959 and 1961 when the famine developed in full scale. Nonetheless, this beginning of famine has provoked disputes over whether it

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[302] Chang and Wen (1997), p. 2

was a FAD famine. Similarly there was a significant increase in the share of government procurement in total grain consumption during the 1932-33 Soviet famine, which, together with FAD, triggered the famine mostly in rural areas.[303] Due to this fact it is still controversial which factor –FAD or compulsory procurement- played more decisive roles in the occurrence of the famine.[304]

In the DPRK famine, however, it seems beyond doubt that FAD was the causation of the famine. There are four reasons. First, FAD pre-dated and triggered the famine in its every stage. Second, the fluctuations of regional food supplies created the geographical movements of the famine. Third, the regional distribution of famine victims corresponded to the differences in regional food supplies. Fourth, there were no feasible policy options to avoid the famine given the degree of FAD.

Consider the first two reasons. To understand both reasons it helps to divide the DPRK famine into three different stages.

8.2.3.1. Famine Stage I: North East in late 1994-June 1995

It was in 1994 that the DPRK food refugees from North East, North and South Hamgyung, began to flee to China, reporting the country's dire food situation. From the sharp increase in official mortality rates in that year we know that their reports actually described the occurrence of famine. The question is: why did the famine start in North East in 1994?

The year of 1994 saw several important changes in food supply. Perhaps the most important one is that China ceased concessional grain export to the DPRK [Annex-table 8-1]. In 1989-94 China was the sole supplier of foreign maize, one of two staple grains rationed in the DPRK. In 1994 however the northern Chinese provinces such as Zillin, which had provided most grain shipments to the DPRK, suffered poor harvests due to cold weather.[305] Together with some political reasons, including the DPRK's growing trade with Taiwan, these poor harvests led to the sudden collapse of Chinese maize export to the DPRK.[306] As a result, the DPRK grain

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[303] Lewin (1985), p. 142-77
[304] Davies and Wheatcroft (1999)
[305] Lee Hy Sang (1999), p. 80-81. For the impacts of cold weather on the DPRK production in that year, see Appendix II of this thesis
[306] Noland (1997), p. 53

import declined to 0.55 million MT in 1994 from 1.54 million MT in 1993 by around 65 percent. Although the domestic harvest of 1993 was reasonably good, it did not reverse the negative effect of shrinking import: total food supply declined by 7 percent in 1994 [table 8-3]. This shows that FAD pre-dated the famine in 1994. But was this degree of FAD enough to generate the famine?

Table 8-5. Rice and Maize Production by Province: 1989-97

(million MT)

	Ave. 89-92	93	94	95	96	97
Special Cities						
Pyongyang	0.46	0.55	0.32	0.21	0.16	0.16
Kaesung	0.15	0.16	0.06	0.07	0.04	0.05
Nampo	0.20	0.23	0.18	0.11	0.09	0.09
Sub-total	0.81	0.94	0.56	0.39	0.29	0.3
(89-92=100)	(100)	(116)	(69)	(48)	(36)	(37)
North West						
S. Pyongan	1.41	1.59	1.34	0.54	0.34	0.42
N. Pyongan	1.35	1.56	1.13	0.36	0.3	0.35
Chagang	0.20	0.19	0.22	0.08	0.08	0.09
Sub-total	2.96	3.34	2.69	0.98	0.72	0.86
(89-92=100)	(100)	(113)	(91)	(33)	(24)	(29)
North East						
S.Hamgyung	0.90	0.57	0.71	0.36	0.23	0.11
N.Hamgyung	0.44	0.22	0.25	0.22	0.14	0.11
Ranggang	0.03	0.04	0.04	0.02	0.01	0.02
Sub-total	1.37	0.83	1	0.6	0.38	0.24
(89-92=100)	(100)	(61)	(73)	(44)	(28)	(18)
South West						
S.Hwanghae	1.86	2.11	1.39	0.84	0.49	0.78
N.Hwanghae	0.83	0.87	0.49	0.29	0.19	0.24
Sub-total	2.69	2.98	1.88	1.13	0.68	1.02
(89-92=100)	(100)	(111)	(70)	(42)	(25)	(38)
South East						
Kangwon	0.36	0.31	0.32	0.18	0.08	0.07
Sub-total	0.36	0.31	0.32	0.18	0.08	0.07
(89-92=100)	(100)	(86)	(89)	(50)	(22)	(19)
DPRK Total	8.38	8.69	6.66	3.37	2.24	2.58
(89-92=100)	(100)	(104)	(80)	(40)	(27)	(31)

Source) DPRK/UNDP (1998a)

This question is answered by table 8-5. An important feature of the 1993 grain (rice + maize) production was that there were great variations in regional harvests. In particular, though most other regions enjoyed bumper harvests, North East faced an extremely poor harvest, which fell by nearly 40 percent compared with the 1989-92 average.

Traditionally North East has been one of the main food deficit areas due to its mountainous geography. Hence the sharp decline in grain production was a great food pressure not only on the local authorities but also on the central government. Indeed per capita production in this region dropped to 153 kg in 1993[Annex table 8-2], making it impossible for local PDS to provide even the reduced ration at that time, 179 kg per person per year or 492 grams per day.[307]

It was therefore necessary for the central government to transfer more grain to North East in 1994 than before, from other local PDSs or abroad, in order to provide the assigned food rations in that region. The difficulty was however that the overall food availability in 1994 declined significantly due to import collapse. The initial response of the government was to re-collect a part of grains that had been already distributed among farm households for their annual consumption, 5 kg per head.[308] As food situation got worse, however, this policy was replaced in late 1994 by the party order to cease all domestic grain shipments to North East.[309]

The result was devastating. According to the DPRK food refugees, PDS rations in North East dropped to 150 grams per person per day in 1994, below even one third of the reduced norm, 492 grams.[310] It is therefore not surprising to find that the famine hit North East first in late 1994.

The above discussion makes two points: 1) FAD at both local and national level pre-dated and triggered the famine in 1994; 2) it also generated the geographical concentration of the famine to North East.

8.2.3.2. Famine Stage II: North West in July 1995-August 1996

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[307] For the rationing norm in 1993, see table 6-1 in chapter 6
[308] Ahn Jong Chul (1996), p. 251
[309] Ahn Jong Chul (1996), p. 251 and Natsios (1999)
[310] KBSM (1998)

The famine entered a new stage with the great flood in July/August 1995. It is at this stage that international aid organisations, including FAO, WFP, UNICEP, International Red Cross and some NGOs, began to visit the country and report its dire food situation to outside world. Interestingly they found that the situation was critical in North West. By December 1995 UN aid agencies reported that they observed famine situations in North Pyongan and Chagang (North West) as well as a part of North Hwanghae (South West).[311] Until August 1996 all the famine symptoms reported by outside observers came out mainly from North West, particularly North Pyongan province. This suggests two possibilities: 1) the famine shifted from North East to North West; or 2) North West fell into a new famine-stricken area, in addition to North East. Then, why?

The year of 1995 was a turning point in the DPRK famine in the sense that total food supply began to dramatically collapse. A new crisis started when national grain production fell by 20 percent in 1994. Facing a potential collapse of national food balance, as discussed in chapter 6, the government made diplomatic efforts to have emergency food shipments from neighbouring countries, including the ROK, Japan and Thailand. Due to the food aid from these countries grain import recovered to 1 million MT in 1995. But it did not compensate for the production decline, and thus food supply in 1995 was down by 11 percent [table 8-3].

The crisis reached a climax when the July/August 1995 flood hit the country. According to official estimates, the flood affected 5.2 million people, including 481,740 homeless, and caused 626,200 MT of grain stock losses.[312] Taking into account these stock losses, actual food supply in 1995 dropped by almost 20 percent. Given that the famine already started in North East in late 1994, it is not surprising that the famine spread over to other regions with such a huge FAD in 1995.

Note that the July/August flood was a geographically confined one. Of total crop damages caused by the flood, 61 percent was in North West and 67 percent of homeless also came from this region.[313] In consequence, the production of North West, traditionally one of rice baskets in the country, completely collapsed in 1995: it dropped to 0.98 million, roughly one third of the 1989-92 average [table 8-5]. It is

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[311] For instance, see OCHA, DPRK-Flood Situation Report, 18 Dec 1995; FAO/WFP (22 Dec 1995)
[312] UN Department of Humanitarian Affairs, assessment of damage and immediate relief requirements following preliminary findings of United Nations Assessment Mission, 12 Sep 1995

true that other regions also suffered crop failures in 1995. But the failures were not as great as in North West.

Now we have the two same conclusions in the second stage of famine as in the first stage: 1) FAD pre-dated and triggered the famine; 2) it generated the geographical movement of the famine to North West.

8.2.3.3. Famine Stage III: National Famine since October 1996

From late 1996/early 1997 outside observers began to witness two important changes in the country's food situation. First, there were now no safe regions from food shortages. Second, North East emerged as the worst food deficit area again.

Between 1997 and 1999 FAO and WFP reported that all country went under immense food stress and particularly the population in highly mountainous North East suffered most from the shortages.

> There are however stark variations in vulnerability based on regional and localised differences in food supply. The provinces on the east coast (North and South Hamgyung and Kangwon), and particularly those in the northeast (North and South Hamgyung) appear to be the most vulnerable. Factors accentuating food supply problems include: dense population concentration; scarcity of good agricultural land; colder climate and short growing season .....[314]

Consistent with this report, UN aid agencies asked the DPRK government to open North East to international aid workers, which was finally accepted in May 1997.

In this stage grain import increased significantly from 1.1 million MT in 1996 to 1.5 million MT in 1998 mainly due to increasing food aid from abroad. However, as mentioned earlier, domestic production completely collapsed and so total food supply dropped to below one half of the 1993 level.

Production collapse was particularly dramatic in the country's traditional rice baskets such as North West and South West. In 1993 per capita production reached 517 kg in North West and 846 kg in South West [Annex-table 8-2]. The figures far exceeded the national average of 410 kg, suggesting that both regions supplied most grain surpluses in the country. In 1996, however, per capita production dropped to

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[313] ibid.

112 kg in North West and 193 kg in South West. Given that the reduced norms of PDS rations were 179 kg per person for official worker, the figures mean that even the country's rice baskets failed to produce minimal ration requirements. It would be quite odd in this situation if any region was free from the famine.

The data also show that North East again suffered the highest production fall in this stage [table 8-5]. Grain production in this region fell below one fifth of the 1989-92 average. It explains why this region appeared as the worst famine stricken area once more.

Now we can repeat the same conclusions as above but for all the stages of the famine this time. First, every stage of the famine was accompanied and pre-dated by FAD. Second, the geographical movements of the famine were determined by the differences in the severity of FAD by regions.

8.2.4. FAD and the Distribution of Victims

Next we consider the relation between FAD and the distribution of famine victims.

Table 8-6 compares variations in βs with regional output changes during the famine period.[315] The data show that the famine was most severe in North East in terms of relative population growth. That is, North East saw the most negative population shock during the famine period. Interestingly North East was also the region where food supply declined most dramatically. In comparison with the 1989-92 level, grain production in this region fell by 54 percent, the highest rate in the country, in 1993-97. And the population faced the lowest food availability, 112 kg per head, for that period [Annex table 8-2].

By contrast, South West in which FAD was not relatively severe appeared to enjoy the most positive population shock. In comparison with the 1989-92 level, grain production in this region declined by 43 percent, slightly lower than the national average of 44 percent, in 1993-97. Above all, the region had the highest food availability in 1993-97, 437 kg per head, which was more than three times North East.

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[314] FAO/WFP (29 June 1999)

[315] For the definition of β and its application to measuring the regional differences in the severity of famine, see section 7.5 in chapter 7

Accordingly relative population growth in that region was higher during the famine period.

This relation between food availability and relative population growth does not necessarily mean that FAD was the main factor determining the regional distribution of famine victims. For, as mentioned in chapter 7, relative population growth is affected not only by the severity of food shortage but also by the government's migration policy. Nonetheless, it suggests that FAD might be an important factor influencing the severity of the famine by regions.

Table 8-6. Relative Population Growth Index (β) and Urban Population Shares During the DPRK famine: 1 January 1994 -31 August 1999

	Change of Relative Population Growth Index (β):1994-99 (β of 1987-93 =100)	Change of Grain Production on Average in 1993-97 (avg. of 1989-92 =100)	Share of Urban Population:31 Aug.1999 (%)
Special Cities	96	61	88
Pyongyang	92	61	92
Kaesung	110	51	65
Nampo	105	70	82
North West	100	58	68
S. Pyongan	97	60	73
N. Pyongan	103	55	60
Chagang	103	66	72
North East	88	45	74
S.Hamgyung	86	43	69
N.Hamgyung	101	44	78
Ranggang	105	87	79
South West	104	57	55
S.Hwanghae	105	60	51
N.Hwanghae	103	50	60
South East	102	53	69
Kangwon	102	53	69
The DPRK	100	56	71

Source) 1. For the relative population growth index, table 7-10 in Chapter 7
2. For production change, table 8-5.
3. For urban population shares, the DPRK's submission to FAO/WFP (8 Nov.1999)

8.2.5. The Absolute Shortage of Food

Lastly, consider a hypothetical question: was it feasible to prevent the famine in the DPRK? According to Ellmann (1999), FAD famines could be divided into two categories: FAD1 and FAD2 famines. FAD1 famines are those in which there is no feasible division of the available food which can prevent famine. In contrast, FAD2 famines are those in which, although food availability has declined, there are feasible policies that could have prevented the famine (or at any rate substantially reduced the number of victims).

Table 8-7. Food Requirement and Availability for Human Consumption in the DPRK

	Food Supply		State Food Ration:	Grain Equivalent for Minimum Calorie
	Total (mil. MT)	Per head (kg)	Reduced Norm for official worker	Requirement by FAO
1992	8.61	406		
1993	8.73	412		
1994	8.10	382	492 grams per day	457 grams per day
1995	7.17	338	or	or
1996	4.22	199	179 kg per year	167 kg per year
1997	3.57	168		
1998	3.86	182		

Source) 1. For total and per capita food supply, table 8-3 and 8-4

2. For official ration, table 6-1 in chapter 6

3. For minimum calorie requirement, FAO/WFP (22 Dec.1995)

Some might think that this categorisation is not practical. For instance, it may not be feasible in many cases to determine the absolute level of food availability below which famine should necessarily happen. Grains are used for various purposes, including human consumption, animal fodder, agricultural and industrial purposes and reserves for future consumption. It is difficult to estimate minimal food requirement for each purpose in a way that everyone would agree on. More difficult is to set up the reasonable distribution priorities among different purposes particularly when food availability declines.

Nevertheless, Ellmann (1999)'s categorisation seems quite useful to understand the DPRK famine, because the available data suggest that the famine was a rare example of national FAD1 famine.[316]

In contrast to market economies and many other socialist economies, as far as human consumption is concerned, it is not so difficult to assess minimal food requirement in the DPRK where food has been rationed for more than five decades. In this country, state food rations have effectively covered the whole population. Of course the norms have changed several times since 1972, and recently actual rations were usually far lower than the norms. Note however that the rationing norms have not been further reduced since daily ration for official worker finally went down to 492 grams per person in 1992.[317] Since then the government has either temporarily stopped providing rations or supplied less food than the norms, instead of reducing them. This suggests that the daily adult ration of 492 grams reflects the minimal level of human food consumption in the DPRK that the government has considered as 'minimal'. Interestingly this ration is similar to the minimum calorie intake for adult, 457 grams of grain per person per day, which is defined by UN. In this respect it seems fair to say that the minimal food requirement for human survival in the DPRK should be around 457-492 grams per person per day.

Table 8-7 compares per capita food supply during the famine period with this minimal food requirement for human survival in the DPRK. Strikingly per capita food supply was below 492 grams per day in 1997. It was of course slightly greater than

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[316] Ellmann (1999) provides an example of FAD1 famine in human history: the Leningrad famine of 1942. But the famine was surely not a national one and happened under a special circumstance of war that German army blocked the city from outside food supply. In this respect the DPRK famine would provide a rather unique example of peacetime national FAD1 famine in human history.
[317] Oh Gyung Chan (1997), p. 148

457 grams, the minimal food requirement defined by UN.[318] Taking into account other basic grain requirements for the reproduction of economy such as seeds and animal fodder, however, the figure seems effectively below the minimal food requirement for human consumption in the DPRK.

It is important to keep in mind that this absolute shortage of food appeared after the population had already been under severe food stress for a long time. Note that the famine started in 1994 and food shortages had begun long before that. This means that there was practically no feasible division of food to prevent the famine at least in 1997. On this basis, we argue that the DPRK famine was an example of rare FAD1 famine.

8.2.6. FAD and the DPRK Famine

So far we have shown five facts about the DPRK famine. First, there was FAD before and during the famine. Second, FAD pre-dated and triggered every stage of the famine. Third, FAD generated the geographical movement of the famine. Fourth, there was a clear relation between FAD and the distribution of victims. Fifth, food availability was so low in the last stage of the famine that there was no feasible division of available food to prevent the famine. It seems therefore obvious that FAD was the causation of the DPRK famine.

8.3. Two Unique Features of the DPRK famine

In contrast to many other socialist famines, the DPRK famine had two unique features. One is that it was primarily an urban famine. Another is that it did not cause a large degree of population loss but, instead, raised a serious long-term health crisis of the whole population. Interestingly, although FAD was the causation of the famine, it does not seem to explain both features very well.

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[318] FAO/WFP (22 Dec 1995)

8.3.1 Urban famine

Perhaps the most distinctive feature of the DPRK famine is that it mainly hit urban population.

It is well known that most socialist famines in human history took place in rural areas. Compared with urban population, rural population were in many cases poorer, had fewer opportunities to increase income and were regarded as less important socially and politically. In the 1932-33 Soviet famine and the 1959-61 Chinese famine, for instance, the government protected urban population with state food rations while agricultural population was forced to be self-reliant on food. This made a large difference between urban and rural mortality during the famine periods.[319]

Surprisingly however the DPRK famine hit mainly urban industrial population. An international aid worker who witnessed the famine put this as follows:

> ..the striking thing about this famine is that it's not occurring in the way that African famines unfold. People tend to be ashamed of being hungry, they tend to stay at home. You don't have large scale population movements between different parts of the country. .... They try to get food and if they don't succeed they simply silently starve at home.
>
> Another striking thing is the fact that it affects the cities more than the countryside especially the industrial cities in the north. We visited one, Wee Chong, which is in the northern part of the country or towards the north, and there you have people silently on the seventh floor of apartment buildings. And they're starving because no food is coming to the city[320]

There are no available mortality data with the breakdown of urban and rural population during the DPRK famine period. Nevertheless, it is not so difficult to show that the famine was an urban famine.

Let us first look again at table 8-6, comparing the changes of βs with the shares of urban population by provinces. The data suggest that the regions with higher

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[319] See Chang and Wen (1997) for the 1959-61 Chinese famine and Wheatcroft (1990) for the 1932-33 Soviet famine. During the 1959-61 Chinese famine, for instance, urban death rate increased slightly from 10.92 per thousand in 1959 to 13.77 in 1960 by around 3 percent point. In contrast, rural death rate soared from 14.61 per thousand in 1959 to 28.58 in 1960 by almost 14 percent point (Chang and Wen, 1997: p.11)

[320] Valfells (1999)

shares of urban population suffered more negative population shocks. For instance, North East that experienced the most negative population shock has the highest urban population share in the country, except Special Cities, while South West with the most positive shock had the lowest urban population share. This means that the famine was relatively more severe where the share of urban population was higher.

Now consider the statements of the DPRK food refugees. As discussed in chapter 7, the refugees mainly came from North East that has the highest urban population share in the country and suffered the most from the famine. According to KBSM (1998), an absolute majority of the refugees said that food situation was more difficult in urban areas than in rural areas. This suggests that urban population was the main famine victims in the worst famine stricken area in the country.

Table 8-8. North Korean Food Refugees' Responses:

More Difficult Area in Food Situation – Urban or Rural

	Urban	Rural	Similar	Unknown	Total
Interviewees	1280	26	137	251	1694
Composition (%)	75.6	1.5	8.1	14.8	100

Source) KSBM (1998)

Finally let us confirm this finding by reviewing the field reports by outside observers. For instance, FAO/WFP mission teams have reported:

> The combination of all these factors have led to polarity in food consumption in various respects, ie people with assets and remittances fare better than those without, the farming community is better placed to meet shortages than the urban population.....Overall, therefore, food shortages are most entrenched in urban areas and, of this, in parts of the population which so far have relied entirely on the PDS for food supply.[321]

Similar observations can be found in many field reports by other international aid agencies, NGOs and individual observers, one of which has been quoted above.

[321] FAO/WFP (25 Nov. 1997)

Note however that, although the famine was generally an urban famine, there was an exception. We have pointed out that the famine mainly hit North West in its second stage, largely due to the July/August 1995 flood. Interestingly there is a variety of evidence that most victims in this stage came from rural areas. First of all, UN aid agencies who began to work in the country from November 1995 found that farming households, who were outside from PDS, bore most burdens of the July/August 1995 flood and thus needed international food aid most urgently.[322] NGOs and individual observers made similar eyewitnesses. The DPRK government also admitted that food situation was particularly bad among farm households, who had faced the depletion of food stock by April 1996 long before the autumn harvest of that year was made, and thus had to be dependent on PDS rations to which they are not entitled.[323]

To conclude, the DPRK famine primarily hit urban population particularly in North East. Despite this general fact however the victims who came from North West due to the 1995 flood were mostly farm households.

8.3.2. Famine in Slow Motion

Another distinctive feature of the DPRK famine is that it did not cause some social groups eruptive demographic losses in a relatively short space of time. Rather, it resulted in a long-term health crisis of the whole population. Due to this feature UN aid agencies have described the famine as 'famine in slow motion'.

Table 8-9 presents birth, death and population growth rates for three socialist famines. In the DPRK famine, total population loss, which was assessed by the difference in population growth rate between normal period and famine period, was less than 0.5 percent. By contrast, the figure rose up to around 3 percent in the Soviet famine as well as in the Chinese famine. This means that the DPRK famine claimed the least population loss among three socialist famines.[324]

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[322] See FAO/WFP (22 Dec. 1995: 13 May 1996: 16 December 1996) and OCHA (18 Dec 1995)
[323] FAO/WFP (6 Sep. 1996)
[324] Although the difference in death rate between normal and famine period was the greatest in the DPRK, it is simply because of the assumption that there was no change in birth rate during the DPRK famine period. Unlike those of China and the Soviet Union, therefore, the famine death rate of the DPRK should be regarded as reflecting total size of demographic loss claimed by the famine, including the loss of births, rather than only the number of deaths (see the discussion of section 7.4 in chapter 7)

Table 8-9. Demographic Impacts of the DPRK Famine in Comparative Perspective

The 1994-99 DPRK famine				The 1959-61 Chinese famine				The 1929-31 Soviet Famine			
Year	Births Per 1000	Deaths Per 1000	Growth Rate (%)	Year	Births Per 1000	Deaths Per 1000	Growth Rate (%)	Year	Births Per 1000	Deaths Per 1000	Growth Rate (%)
1993	20.5	5.6	1.5	1957/58	40.3	19.1	2.12	1929/30	37.9	19.7	1.8
				1958/59	*34.0*	*24.4*	*0.96*	1930/31	35.4	19.6	1.6
1994-99				*1959/60*	*28.9*	*32.8*	*-0.39*	*1931/32*	*31.9*	*20.5*	*1.1*
Average	*22.5*	*11.9*	*1.06*	*1960/61*	*22.7*	*29.5*	*-0.68*	*1932/33*	*25.3*	*37.7*	*-1.2*

* italics are the rates affected by the famines

Source) 1. For the DPRK famine, table 7-9-A and B in chapter 7.
2. For the Chinese famine, Ashton, Hill and Piazza (1984) p. 618
3. For the Soviet famine, Wheatcroft (1990) p. 358

However, this low level of demographic loss makes the DPRK famine look puzzled. Of those three socialist famines, as discussed already, the DPRK famine saw the most serious FAD. But it caused the least demographic loss. Why?

To make the issue more complicated, despite this low level of demographic loss the DPRK famine does not seem mild at all, in terms of the health risks it posed to the population. Table 8-10 illustrates the severity of mal-nourishment of the DPRK children during the famine period. According to EU/UNICEF/WFP nutritional survey that was carried out on randomly selected samples across the DPRK, around 16 percent of the DPRK children under 6 were wasted, 62 percent stunted and 61 percent underweight.[325]

Table 8-10. Nutritional Status of the DPRK Children

(%)

	Wasted (acute Malnutrition)	Stunted (Chronic Malnutrition)	Under Weight
DPRK	15.6	62.3	60.6
Niger	15	40	43
Sierra Leone	9	35	29
Angola	6	53	42

Source) 1. For the DPRK, WFP (1998)

2. For other countries, UNICEF (1999)

These figures are striking in several respects. First, children's nutritional status in the DPRK was effectively the worst in the world in the sense that even the countries with the highest mortality rates under 5 in the world such as Niger and Sierra Leone managed to feed their children better. Second, given that the DPRK famine started in 1994, this miserable nutritional status lasted for a long period, at least for 4-5 years, as evidenced by the fact that 62 percent of children suffered from chronic malnutrition (stunted). Third, the EU/UNICEF/WFP survey was carried out after children's nutritional status was known to improve considerably due to several years of international food aid. It means that the children's nutritional status was actually far worse during the famine than what the survey shows. Fourth, of various

[325] This survey result was publicised by WFP (1998)

DPRK age groups, children under 5 have been best protected by both international food aid and the country's rationing system. Indeed international food aid has mainly targeted children and pregnant women in the country. And the DPRK government has also been reported to allocate children's food rations directly to nurseries and schools, the social institutions under state control, in order to ensure that the rations have directly reached the children with the first priority.[326] This means that during the famine period not only the children but also virtually the whole population were exposed to severe malnutrition and corresponding health risks.

In many historical famines FAD expressed itself as eruptive population losses for a relatively short space of time. In addition, the high famine mortality hit in many cases only some social, regional and age groups, not all the groups. By contrast, in the DPRK famine even a huge degree of FAD seemingly failed to cause such eruptive population losses. Instead, it manifested itself as ongoing severe malnutrition of the whole population for a relatively long period. In this respect what characterises the DPRK famine most is not the size of short-term demographic losses it caused, but the implications of long-term health risks it imposed on the country. An international aid worker puts this as follows.

> Until this time famine happened mostly in unorganised countries. When famine occurs in these countries, some regions eat well and some regions die. However, since the DPRK is well organised, all manage to eat and survive under the control of the government. In this case people may die less, but in the long run there appear such problems that (children's) heights do not grow.... And their brains do not develop. In laboratories we have many experiments on mice. The DPRK could be a laboratory. There are reports that children under 5 suffering hunger have their brains underdeveloped. If not recovered, they have also other body problems.... [327]

Due to the lack of available information it is difficult to assess the implications of this so-called 'famine in slow motion'. Nevertheless it seems clear that the DPRK famine provided a new type of famine the real impacts of which may be unknown yet.

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[326] FAO/WFP (6 Dec. 1996) and Park Gyung Suh (1997)
[327] Linton (1997)

8.4. Food Rationing, Entitlement and Urban Famine

In chapter 1 of this thesis we have argued that the DPRK agricultural institutions have characterised the basic patterns of the country's food shortages. In this and next section we indeed study how the institutions has generated two unique features of the 1994-99 DPRK famine. To do this we take the basic concept of modern economics of famine: entitlement.[328] In this section we begin by examining how a person's entitlement is determined under the DPRK agricultural institutions. Then we study how the DPRK entitlement system affected the food distribution during the famine period, explaining the reasons why the DPRK famine was an urban famine.

8.4.1. Food Rationing and Entitlement in the DPRK

In the DPRK all grains are rationed.[329] And both private grain production and trade are strictly prohibited. Other food items such as vegetables are also predominantly rationed. But the regulations on their private production and trade are not as strict as in grains. Both farm households and urban workers are given small sizes of private plots, being allowed to produce other food items for their own consumption or for farmers' markets where the prices depend solely on supply and demand. From the viewpoints of consumers, grains are available only from state rationing agencies. For other food items, however, consumers could purchase them not only from state retail networks but also from farmers' markets as well as from their workplaces that may have independent supply contracts with cooperative farms. A person's entitlement in the DPRK is therefore affected by various factors, including state rations, rationing prices, income and market conditions. As far as food grains are concerned, however, his/her entitlement is extremely simple: it should be equal to his/her rations.

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[328] Entitlement refers to the set of the alternative bundles of commodities that a person can acquire in exchange for what he owns. Therefore a person starves when his/her entitlement does not include enough food for survival (entitlement failure). Modern economic of famine tends to study why, how and whose entitlement fails during the famine period in order to explain the causation, patterns (categories) and victims of famine. See the concept of entitlement, see the chapter 1 of Sen (1981)

[329] For the development of the DPRK rationing system, see the related sections of chapter 3-5

Table 8-11. Grain Purchase Ability of Average Official Worker in the DPRK: 1992

	Wage (won)	Purchasing PDS Ration			Purchasing Grain in Market			Total Grain Availability (kg)
		monthly ration (kg)	price per kg (won)	total price (won)	Income left after buying the PDS ration (won)	price per kg (won)	quantity of max. purchase (kg)	
	(1)	(2)	(3)	(4) = (2)*(3)	(5) = (1) – (4)	(6)	(7) = (5)/(6)	(8) = (2) + (7)
I. Standard Ration (700 gram per day)	70	21	0.08	1.7	68.3	25	2.7	23.7
II. Reduced Ration (492 gram per day)	70	14.8	0.08	1.2	68.8	25	2.7	17.5

Source) 1. For monthly ration, table 6-1 in chapter 6
2. For other figures, the ROK National Statistical Office, *Comparison of Economic and Social Aspects Between North and South Korea*, 1997

Table 8-12. Market Rice Price in 1990-1998

	1990	1992	May 1996	1997	1998
Won Per kg	20	25	100	102.5	82.5

Source) the ROK National Statistical Office, *Comparison of Economic and Social Aspects Between North and South Korea*, various years

There are of course many reports that it has been effectively liberalised to cultivate grains, mainly maize, in private plots and trade them in farmers' markets since the early 1990s.[330] Despite this fact, however, it does not seem wise to assume that there was a fundamental change in a person's entitlement during the famine period.

Table 8-11 shows that market grain prices were too high for normal households to afford even in 1992 two years before the famine started. In the DPRK the salaries of workers in state sector that absorbs all non-farming population are basically determined at the level of so-called living costs [*Saengwhalbi*] that are based on state rationing prices for goods. In 1992, however, market rice price was roughly three hundred times the rationing price, so that an average official worker could buy only 2.7 kg of rice in market with his/her entire monthly income of 70 North Korean won. This amount was around one tenth of his or her monthly standard ration and one seventh of reduced ration. Moreover, table 8-12 shows that market prices rocketed up by more than ten times during the famine period. This indicates that a vast majority of households could not buy even an extremely small amount of grains in market so that, when state rationing system failed to provide adequate food supply, they should eventually starve.

In this respect we assume that a person's entitlement in the DPRK during the famine period was basically his/her food ration, even though there were limited opportunities to obtain additional food.

8.4.1.1. The DPRK Food Rationing System

The DPRK food rationing system covers effectively the whole population, including farm households. Table 8-13 presents four social groups with different entitlements in that system.

All farm households in cooperative farms should be in principle self-sufficient on food. They should not expect any food supply from the government, thus being excluded from PDS rations, food import and even international food aid channelled by the government. Nevertheless, their food consumption is protected and controlled

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[330] Kim Yeon Chul (1997) and Chun Hong Taek (1997b)

Table 8-13. Food Rationing System in the DPRK: 1993

	Rationing Band	Ration			Supplier
		standard quantity (adult)*	ratio of rice and maize	interval	
[Non-Farmer]					
Centrally Supplied Population	Group 1	700 gram per day	rice 100 %	2-3 days or on demand	Security Division, President Palace
	Group 2	700 gram per day	rice 100 %	3-7 days or on demand	Supply Dept. of the party or Cabinet Office
	Group 3	700 gram per day	rice 100 %	Weekly or biweekly	No.1-4 Suppliers, People's Service Com.
Generally Supplied Population	Group 4	700 gram per day	rice 60% in Pyongyang, 30% in other areas	Biweekly	'Dong' Warehouse
	Group 5	800 gram per day	rice 60% in Pyongyang, 30% in other areas	Biweekly	'Dong' Warehouse
	Group 6	700 gram per day	rice 60% in Pyongyang, 30% in other areas	Biweekly	'Dong' Warehouse
[Farmer]					
	State Farm	Group 5's ration	Group 5's ration	6 month rations supplied at once, another 6 moth rations supplied biweekly	6 month rations by 'Dong' Warehouse, another 6 month rations by each state farm
	Cooperative Farm	Around 260 kg Per year	varied by products	annual ration supplied at once	Each cooperative farm

* In 1972-92 the norm for the ration reduced three times from standard quantity. In 1993 therefore the actual norm was 492 gram per day for group 4.
* group I: members of the party politburo, group II: the members of the party central committee, the heads of departments in the party and Cabinet, the party and government officials in Pyongyang and corresponding local officials, high profiles of all social sectors, group IV: official workers, group V: industrial workers with heavy physical demanding such as miner, group VI: industrial workers

Source) Cho Myung Cheol (1996) and the ROK Ministry of Unification (1992:1997)

by state rationing system. On the one hand, they are entitled to keeping aside their annual rations, the amounts of which are determined by the government, from their production before they sell the production to state. On the other hand, they should sell all remaining grains to state procurement agencies.

For farm households in state farms that specialise in non-grain production such as animal rearing, seed production and fruits cultivation, 6 month rations are allocated in one occasion shortly after harvest and another 6 month rations are provided biweekly by PDS.

Together with imported grains, the procured grains from farm households constitute state grain reserves, being eventually rationed among non-farm households by PDS. All non-farm households are entitled to PDS rations, but they are divided into two separate groups with different entitlements. A group is so-called 'centrally supplied population' that includes high government officials, important military personnel and high profiles in every sector of society. Their rations are provided either daily, weekly or biweekly by the party or by some special suppliers in the government. All other non-farm households called 'generally supplied population' purchase their rations biweekly at food warehouses in labour districts under the control of People's Service Commission.

8.4.1.2. The DPRK Entitlement System

A distinctive feature of the DPRK food rationing system is that it includes farm households as the first claimants of farm production for their annual food rations.[331] In this respect the DPRK differs from many other socialist countries where the government was the first claimant that deducted compulsory procurement quotas from the production before it was distributed among farm households. Due to this feature the rationing system tends to operate more favourably to farm households than to their counterparts in urban industry, particularly for the period of food shortage.

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[331] Note that the production here means 'net production' that remains after deducting necessary costs from total production, that is, the costs for seeds, waters, fertilisers, electricity, agricultural machinery and so on. Because state owns and provides all such necessary agricultural inputs, cooperative farms should pay for the inputs before the production is distributed among members. Hence, when the production fell so as not to pay such costs, farm households could starve even while the government still collects grains from cooperative farms. For details, see section 3.2.4. in chapter 3.

It is of course 'centrally supplied population' that is best protected by the DPRK rationing system. It is hard to imagine that this group experienced any decline in its food consumption even during the famine period. Apart from this group, however, farm households have a relatively stronger position in the DPRK rationing system, in compared with other ordinary PDS population. Indeed, as we shall see below, farm households proved to receive considerably higher rations than PDS population during the famine period.

The strong position of farm households entails two basic features of their entitlement. First, in compared with the entitlement of PDS population, the entitlement of farm households is relatively safer from the adverse influences of production failures. Second, it is also free from the risk that the supply of rations suddenly stops or declines due to adverse seasonal factors.

Consider the first feature. In the DPRK it is not easy for the government to unevenly pass over the burden of production failures to farm households. When farm households deduct their rations from production ahead of state procurement, any change in the production would firstly express itself as the change in the procurement unless the production goes down below their annual ration requirements. It provides a basic reason why farm households can have relatively safer rations from production failures.

Of course, when the decline in state procurement cause a significant reduction in PDS rations, the government will reduce farm household rations accordingly. Even in this case, however, there are several factors that prevent the government from reducing farm household rations more sharply than PDS rations.

Firstly, the DPRK is an over-industrialised country where (urban) industrial population comprised 60 percent of total population in 1993. Therefore, when there are food shortages, it is far more difficult to sustain the given level of PDS rations by reducing farm household rations than to do the opposite. Secondly, the DPRK authorities have connected farm household rations to the PDS rations for heavy manual workers (PDS group 5) since farm households were absorbed into state rationing system in the early 1950s.[332] Because this routine has been maintained for around five decades, it should be difficult to make a sudden gap between farm

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[332] See section 4.3.2.2 in chapter 4

household rations and the corresponding PDS rations. Thirdly, the rapid reduction in food rations would drive farm households out of cooperative farming into private grain production and trade, although the latter is still illegal. Given that the DPRK agriculture has suffered from permanent labour shortages, it would lead to the further decline in official production and thus state food reserves.

What about the second feature? In the DPRK, farm households are entitled to receiving their annual rations at once shortly after harvest. Hence, their daily rations are effectively fixed over the year at the beginning of new agricultural year. By contrast, PDS rations are supplied normally biweekly. It has two implications. First, the intended level of PDS rations may fluctuate over the year, depending on seasonal food situation. In particular, when there are ongoing food shortages, the level is more likely to fall because food situation generally gets worse as time passes by after harvest. Second, when there are unexpected shocks adversely affecting state food reserves, including the cessation of concessional food shipments from other socialist countries and the decline in international food aid, the government could fail to supply the intended level. The central government might order the local authorities to stop providing rations temporarily; and the local authorities might supply less rations than the amounts ordered by the central government.

To conclude, when there are food shortages, the DPRK rationing system intrinsically provides relatively more stable and adequate food supply to farm households than to PDS population. It would be therefore not surprising to find that PDS population suffered more dire food situation than farm households during the famine period.

8.4.2. Entitlement, Farm household Ration and PDS Ration

Table 8-14 presents the real amounts of food rations provided for farm households and PDS population in the agricultural years of 1996-99. Annual average rations are constructed from the reported DPRK figures to FAO/WFP mission teams that have visited the country every year since 1995 [see Annex table 8-3]. In the agricultural year of 1996, for instance, the government informed that it provided PDS population with 452 grams of daily ration per person between November 1995 and March 1996,

250-300 grams between April and June 1996, and 200 grams between July and October 1996. We average these monthly figures, obtaining the average daily ration of 324 grams in that year. The government also reported that farm households in cooperative farms received around 100 kg of grain per person for their annual food consumption in November 1995. Dividing this annual figure by 365 days we have the average daily ration of 274 grams for the agricultural year of 1996.[333]

Table 8-14. Reported Food Rations to Farmers and Non-farmers: Nov.1995 – Sept.1999

(annual average: gram per person per day)

	Nov.95-Oct.96	Nov.96-Oct.97	Nov.97-Oct.98	Nov.98-Sept.99
Non-farmers	324	154	133	268
Farmers	274	219	370	400*

* average for 12 months from November 1998 to October 1999.

Source) Annex table 8-3

As expected, farm households had generally far more favourable food supply during the famine period. Their rations were much greater than PDS rations for three years from November 1996 to September 1999. Further, farm household rations gradually increased for that period, which was not the case for PDS rations. The only exception was the 1996 agricultural year when PDS population received around 20 percent more than farm households did.

An interesting observation is that these differences between farm household rations and PDS rations are quite consistent with the selection of victims by famine stages. As pointed out already, the famine mainly hit urban dwellers particularly in North East. In terms of famine stages urban dwellers (North East) appeared as the main victims in the first stage in 1994-June 1995 and the third stage in October 1996-1999. The exception was the second stage between July 1995 and August 1996 in which the victims came mainly from farm households in North West.

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[333] Because the reported figures are rather over simplified, it would be inappropriate to argue that the figures presented by table 8-14 are absolutely precise. Nevertheless they would not cause severe difficulties in understanding the general levels of rations during the DPRK famine.

Combing this fact with the above rationing figures, we can make the following conclusions. First, it was the distribution of food rations among social groups that determined the selection of victims in each stage of the famine. Second, generally farm households had more favourable rations than PDS population. In consequence, the victims mainly came from urban areas. Third, however, in the agricultural year of 1996 PDS rations were considerably greater than farm household rations, driving mainly farm households into the victims.

Of these conclusions, the first two are rather straightforward given the difference between the entitlement of farm households and that of PDS population. But the third conclusion seems to require some additional comments.

There is no hard evidence concerning the reasons why farm households received less rations than PDS population in the agricultural year of 1996. Nevertheless, it seems rather obvious that the main reason was the 1995 July/August flood. As mentioned already, the flood caused 626,200 MT of grain stock losses, most of which came from rural areas. Given that the flood occurred at the nearly end of the 1995 agricultural year, this massive scale of losses should destroy all the remaining grain reserves owned by both many farm households and cooperative farms. To avoid starvation, therefore, farm households should in principle receive grain loans from cooperative farms, which would be the case in normal years.[334] It is however doubtful how many cooperative farms could afford the loans given the severity of their own stock losses. In this respect the additional food supply to farm households between July and October 1995 must be made in a different way: distributing unripe grains from fields before normal harvest commenced.[335] This before-harvest-grain distribution should be deducted from annual farm household rations after harvest, which seems to be the main reason why the latter was smaller than PDS rations in 1996.

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[334] See section 4.3.2.2 in chapter 4

[335] Indeed this before-harvest-grain distribution emerged as an important national coping strategy during the famine period. For instance, FAO/WFP mission teams began to witness similar before-harvest-grain distributions from the 1996 agricultural year (FAO/WFP: 6 Dec. 1996). The DPRK government officially admitted in 1998 that it allowed both cooperative farms and regional PDS to distributed a part of production before harvest (DPRK/UNDP: 1998a).

Table 8-15. Official Food Allocations to Farmers and Non-Farmers (PDS Population) From Domestic Production: Nov.1997-Oct.1998

	Allocation to Farmers			The Supply of Food Rations to Non-Farmers (PDS Population)										
	Allocation (MT)	Farm Pop. (thousand)	per head (kg)	Nov.97 (MT)	Dec.97 (MT)	Jan.98 (MT)	Feb. (MT)	Mar. (MT)	Apr-Aug. (MT)	Sept. (MT)	Oct.98 (MT)	97/98 total (MT)	PDS Pop. (thousand)	per head (kg)
1. Special Cities														
Pyongyang	42500	244	175	27750	27750	20800	13800	2700	0	10415	10415	113630	2800	41
Kaesung	20900	135	155	2050	2050	1500	1000	200	0	459	459	7718	251	31
Nampo	22100	147	151	4550	4550	3400	2300	400	0	1150	1150	17500	667	26
2. North West														
South Pyungan	136000	837	162	15000	15000	11200	7500	1500	0	5650	5650	61500	2263	27
North Pyungan	151100	1050	144	10150	10150	7600	5100	1000	0	2550	2550	39100	1575	25
Chagang	52600	345	152	9350	9350	7000	4600	900	0	2350	2350	35900	887	40
3. North East														
South Hamgyung	149300	909	164	13600	13600	10200	6800	1300	0	2720	2720	50940	2023	25
North Hamgyung	79600	490	162	13100	13100	10000	6700	1300	0	2620	2620	49440	1737	28
Ryanggang	35700	148	242	5250	5250	3900	2600	500	0	1050	1050	19600	555	35
4. South West														
South Hwanghae	188000	1122	168	10300	10300	7700	5100	1000	0	3860	3860	42120	1168	36
North Hwanghae	111500	694	161	9150	9150	5500	3700	700	0	2400	2400	33000	1040	32
3. South East														
Kangwon	77700	455	171	5650	5650	4200	2800	500	0	1450	1450	21700	1012	21
DPRK Total	1067000	6574	162	125900	125900	93000	62000	12000	0	36674	36674	492148	15980	31

* Allocations to farmers include grains for human consumption, seeds and fodder. But food rations for PDS population are only for human consumption.
* provincial population figures are on 31 August 1999.

Source) 1. For food allocation figures, the DPRK's submission to DPRK/UNDP (1998a) and to FAO/WFP (Nov. 1998)
2. For population figures, the DPRK's submission to FAO/WFP (Nov.1999)

8.4.3. Entitlement and Food Supply Pattern

Table 8-15 presents provincial food allocations between farm households and PDS population in the agricultural year of 1998. Note that farm household allocations include not only food rations but also other grain requirements for agricultural production such as seeds and fodder, whereas PDS rations were pure food rations for urban population. Unlike in table 8-14, therefore, it would be inappropriate to directly compare two figures. Nevertheless, the data reveal several interesting features of the DPRK food supply pattern.

Let us first look at regional variations in food supply. On the one hand, farm household allocations were relatively evenly distributed across the country. Except Ryanggang province that has the smallest size of (farming) population in the country, per capita grain allocation ranged from 144 kg in North Pyongan to 175 kg in Pyongyang. Given that grain production per farmer varied immensely from 103 kg in Kangwon to 442 kg in South Hwanghae [see Annex table 8-4], there were relatively little differences in farm household allocations by provinces. This indicates that there was a nationally unified norm for farm household allocations; and this norm was relatively well applied across the country.

On the other hand, PDS rations had great provincial differences. For instance, per capita annual PDS ration was mere 21 kg in Kangwon, being almost half of 41 kg in Pyongyang. The figure was also very low in South Hamgyung and North Pyongan, two provinces where the food situation was reportedly the worst in North East and North West respectively. This suggests that unlike farm household allocations PDS rations were not provided precisely according to the nationally unified norm; and consequently some provinces suffered far lower rations than others.

Now look at seasonal variations in food supply. By definition there must be no seasonal variation in farm household allocations. By contrast, PDS rations varied immensely by seasons. In all provinces PDS rations reached the peak in November and December 1997 when new grains were collected and transferred to state food reserves, but fell considerably until March 1998. And there was no supply of PDS rations for five months from April to August in 1998. The supply was finally resumed

in September and October 1998 when new-planted grains grow enough to be consumed before harvest.

Table 8-16. Provincial and Seasonal Variations of Food Supply: Nov.97-Oct.98

	Provincial Variation				Monthly Variation			
	Average	Max.	Min.	Std. Dev.	Average	Max.	Min.	Std.Dev.
PDS ration	100	132	69	20.42	100	306	0	120.45
Farm allocation	100	145	86	14.99	100	100	100	0

Source) Table 8-15.

Table 8-16 reports the above findings in a more formal way. The provincial variation measured by standard deviation is considerably greater in PDS rations than in farm household allocations. The monthly variation of PDS rations also fluctuates greatly while that of farm household allocations should be essentially zero.

From table 8-15 and 16 the following conclusions can be drawn. First, during the famine period the DPRK rationing system provided relatively stable food supply to farm households both regionally and seasonally. This suggests that, insofar as farm households were concerned, the severity of the famine was distributed relatively evenly among regions and seasons.

Second, PDS rations varied greatly by regions: hence PDS population in some provinces suffered more from the famine than those in other provinces. Now let us recall that the overall level of PDS rations was lower than that of farm household rations during the famine period, and that there were no such great regional variations in farm household rations as in PDS rations. It means that PDS population in those provinces with relatively lower PDS rations were those who suffered the lowest food supply during the famine period. Needless to say, they were also the main victims of the famine.

Third, PDS population suffered a great instability in seasonal food supply. As discussed later, there was so-called 'lean season' during the famine period when PDS rations ceased completely or fell dramatically. Of course, because international food aid could be still channelled by the government, PDS population did not necessarily starve completely even in this season. Nonetheless, it seems straightforward that this

season imposed great health risks on PDS population. Perhaps many farm households also faced similar lean season as their annual rations were depleted. But there is an important difference: farm households could prepare for lean season by planning and controlling their seasonal food consumption using their annual rations in their hands, which was reportedly the most important coping strategy in household level. Clearly this strategy was not available for PDS population who have to buy their rations biweekly. This means that, even when there was no difference between the level of farm household rations and of PDS rations, PDS population faced greater health risks during the famine period.

8.4.4. The DPRK Food Distribution in Comparative View

Table 8-17 presents rural and urban food supply during the 1994-99 DPRK famine and the 1959-61 Chinese famine. Note that food supply differs from food ration by definition. For instance, urban food supply should include not only human food consumption but also intermediate usage of industry as well as the increase in state food reserves. Similarly rural food supply should entail the food consumption of farm households, seeds and animal fodder etc. In table 8-17 we identify urban food supply with government procurement, because the latter was the only source to provide food to urban areas, including industry, for the concerning years. Accordingly rural food supply is defined by grains left in village after government procurement. In the DPRK, rural food supply should be also equal to farm household allocations.

In the DPRK, per capita food supply was much greater in rural area than in urban area during the famine period. By contrast, the opposite was the case in China. An interesting point is that the gap between rural and urban food supply is much greater in the DPRK. Rural food supply was more than four times urban food supply in the DPRK while urban food supply was slightly greater or similar to rural food supply in China. What should be note here is that due to this gap the 1959-61 Chinese famine saw higher excess death rates in rural areas than in urban areas.[336] This suggests that in the DPRK the famine mortality was more likely higher in urban areas, not only because the food supply was lower in urban areas than in rural areas, but also

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[336] See footnote 319

Table 8-17. Rural and Urban Food Supply: the Chinese Famine vs. the DPRK Famine

The 1994-99 DPRK Famine							The 1959-61 Chinese Famine						
	Grain Distribution (1000 MT)		Population of 31 Aug 1999 (thousand)		Per Capita Grain Supply (kg)			Grain Distribution (1000 MT)		Population (million)		Per Capita Grain Supply (kg)	
Year	Grain left in village (1)	State procurement (2)	Rural (3)	Urban (4)	Rural (1)/(3)	Urban (2)/(4)	Year	Grain left in village (7)	State procurement (8)	Rural (9)	Urban (10)	Rural (7)/(9)	Urban (8)/(10)
							1957	161175	33870	547	99	295	342
							1958	158275	41725	552	107	287	390
Nov.97 - Oct.98	*1067*	*581*	*6574*	*15980*	*162*	*36*	*1959*	*122435*	*47565*	*548*	*123*	*223*	*387*
							1960	*112605*	*30895*	*531*	*130*	*212*	*238*
							1961	*121695*	*25805*	*531*	*127*	*229*	*203*
							1962	*134280*	*25720*	*556*	*116*	*242*	*222*

*italics are famine years

Source) 1. For the DPRK famine, Annex Table 8-4
2. For the Chinese famine, Chang and Wen (1997)

because the gap between rural and urban food supply was so great enough to produce significant differences between urban and rural mortality rates.

8.4.5. The DPRK Entitlement System and Urban Famine

Now it does not seem surprising at all that the 1994-99 DPRK famine was an urban famine. In this section we have established four facts concerning rural and urban food supply during the famine period. First, in the DPRK rationing system farm households tend to have stronger entitlements than urban population, particularly for the period of food shortage. Second, farm household rations were actually significantly higher than PDS rations during the famine period. Third, the supply of farm household rations was more stable both regionally and seasonally than that of PDS rations. Fourth, the gap between rural and urban food supply was greater in the DPRK famine than in other socialist famines that saw significant differences between rural and urban famine mortality.

To conclude, farm households had stronger entitlements during the famine period, which made the famine an urban famine.

8.5. Entitlement, National Coping Strategies and Famine In Slow Motion

Another important consequence of the DPRK entitlement system is that it led to the appearance of national coping strategies, a main purpose of which was to minimise the demographic loss of urban population. The basic reason why the DPRK avoided massive increases in mortality rates during the famine period was the existence of these strategies. In this section we study what the strategies were, why they appeared and how they influenced the famine. The primary purpose of this study was to understand so-called 'famine-in-slow motion'. In the process of the study, however, we also answer two basic disputes over the famine: 1) Were there any policy failures concerning the famine; 2) particularly were there food distribution failures and, if so, did they cause or exacerbate the famine?

8.5.1. Entitlement and the Government's Response to Famine

A common feature of many socialist famines is that they were largely affected by the government's policy failures. In the case of the 1932-33 Soviet famine, for instance, the government has been blamed to pay little attention to rural food situation, collect too much grain from farm households who eventually fell into the famine victims, block international aid efforts and even export grain during the famine period. Similar blames have also been made to the Chinese government with respect to its 1959-61 famine. Of these policy failures, the followings should be particularly noted.[337]

1) Information failure: The government failed to comprehend real food situation in the early stage of famine. Either the central government was misinformed by local cadres who reported highly exaggerated output figures, or it did not believe the reported figures from below when they showed sudden and considerable declines in outputs.[338] This hampered the government's understanding of famine.

2) Relief failure: The government did not pay enough attention to organise famine-relief programs. On the contrary, it denied international food aid and even exported grain during famine period.[339] It exacerbated famine that would remain a much smaller one otherwise.

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[337] As Eberstadt (1997) pointed out, most socialist famines happened with sudden institutional changes mainly accompanying or following agricultural collectivisation. The 1932-33 Soviet famine was directly influenced by sharp increase in stipulated procurement quotas after the forceful agricultural collectivisation (Conquest, 1986: Lewin, 1985). And the 1959-61 Chinese famine followed the radical communisation of farms and the introduction of communal dining system (Lin, 1990; Chang and Wen, 1997: Yang, 1996). Some other socialist famines such as the Cambodian famine in the early 1970s were also similar (Eberstadt: 1997). But there exist socialist famines that occurred without such institutional changes. For instance, there were three or four different famines under the communist regime in the USSR, but it was only the 1932-33 famine that occurred with significant institutional changes (Ellmann, 1999). And clearly the 1994-99 DPRK famine was not caused by such institutional changes. Indeed, as discussed in chapter 3-5, all the DPRK agricultural institutions were primarily established between the late 1950s and the early 1960s, and had remained remarkably stable until the recent food crisis occurred. In this respect we do not discuss institutional changes concerning policy failures during the DPRK famine period.

[338] See Chang and Wen (1997: p. 3) for so-called 'exaggeration wind' of grain outputs concerning the 1959-61 Chinese famine. And see Davies, Harrison and Wheatcroft (1994: p. 115-116) and Davis and Wheatcroft (1999) for the statistical confusions of grain outputs during the 1932-31 Soviet famine.

[339] For instance, see the famous Sen vs. Nolan controversy over the relation between democracy and famine prevention particularly in the case of the 1959-61 Chinese famine (Nolan, 1993: Sen 1993).

3) Distribution failure: The government procured too much grain from farm households. Even when there was a significant decline in production, state procurement quota did not fall accordingly, partly because urban food demand was on increase due to rapid industrialisation derive, and partly because the government ignored the rural food situation.[340] As a result, farm households fell into famine victims.

Considering the entitlement systems in many socialist economies, these policy failures are not surprising. Because the government was the first claimant to deduct state procurement quotas from farm production, it might not be greatly interested in actual output variations at least in short term unless the variations caused difficulties in enforcing the quotas. Hence the government might fail to grasp real food situation in rural areas. Further, even when the government was aware of the situation, it could not reduce state procurement quotas appropriately because it had an obligation to supply food rations to urban population while farm households were excluded from the rations. In particular, if the government regarded farm households as being unimportant politically and economically, it might be reluctant to organising famine relief programs. Rather it could be more inclined to blocking the embarrassing information of the famine from spilling over to outside world.

As discussed in chapter 6, there are many arguments that the DPRK government made similar mistakes. The government has been blamed for being accustomed to highly exaggerated output figures, blocking international aid agencies from working freely in the country and diverting food aid for military purposes. Some argues that the government deliberately excludes certain social groups from state food supply, forcing them to starve.

Are these allegations well founded? It is difficult to give a definite answer because many necessary data are missing. Nevertheless, the DPRK entitlement system casts doubts on these allegations.

In the DPRK, farm households are the first claimants of production for their annual food rations: hence the decline in production is more likely to cause contraction in state procurement. This means that the government should be well

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[340] See Conquest (1986) and Lewin (1985) for the 1932-31 Soviet famine, and Bramall (1993) for the 1959-61 Chinese famine.

aware of real food situation, whether or not announced official output figures are exaggerated. For the same reason the government has relatively little chances to make distribution failures such as too much grain collection from rural areas or deliberate exclusions of farm households from state food supply. Moreover, as discussed already, the burden of food shortage is more likely to fall on urban population. Therefore, assuming that urban population is the backbone of the country's socialist regime, the existence of famine may be critical to the government politically and economically. Within this framework the government should be keen on alleviating the famine, say, increasing food import and receiving international aid, rather than on hiding it from outside world.

8.5.2. Information Failures (?)

Consider whether the DPRK government had proper knowledge about the country's food situation from the early stage of famine.

It seems clear that the government has been well aware of the food situation since the famine started in 1994. As presented by table 8-1, official statistics show that the country's grain production has drastically declined since that year. It would be quite strange if the government with such official statistics did not know the country's deteriorating food situation.

What about the years before 1994? Surely official statistics do not show any significant decline in grain production. Nevertheless, it seems clear that the government was well aware of deteriorating food situation long before 1994. As discussed in chapter 6, for instance, PDS rations were officially reduced by 10 percent in 1987, which was soon followed by a series of economic reforms to encourage private food production and trade.[341] In the early 1990s the government openly admitted agricultural policy failures. Kim Il Sung personally oversaw in agricultural policies again and ordered economic planners to provide all necessary agricultural inputs, including fertiliser, electricity and machinery, with any costs. The slogan of "rice is communism" re-appeared, and so-called "agriculture first, light industry first,

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[341] Kim Yeon Chul (1997) and Chun Hong Taek (1997b).

trade first" policies dominated the DPRK economic agenda.[342] These policy changes would not be made if the government considered the country's food situation as normal.

That the government was well aware of the country's food situation before and during the famine period can be shown in a slightly different way.

Table 8-18 shows that the DPRK grain import jumped in the mid 1980s and has gradually increased since. By contrast, grain export has almost disappeared since 1986. As a result, the country has turned into a net grain importer since. Of course, it had not been a grain exporter even before the mid 1980s. But it had not been a net grain importer either. In 1975-85, for instance, the DPRK grain trade recorded surpluses for two years, deficits for eight years and kept a balance for one year in physical terms. On annual average the country saw 124 thousand MT of deficits: hence it was a net grain importer in physical terms. Surprisingly, however, it was a net grain exporter in dollar terms. During that period its grain trade recorded surpluses for seven years and deficits in four years in dollar terms. Hence, on annual average the country made 7.5 million dollar of grain trade surplus. It means that the DPRK was basically a food self-sufficient country that was capable of importing enough foreign food items simply by exporting its other domestic food items. But this capability has collapsed since the country transformed itself into a net grain importer both in physical and dollar terms in 1986. Then, why?

The reason is found in the change of main import items. By 1985 the DPRK had imported almost a single item, wheat. But maize appeared as an import item in 1986 and has dominated the country's import in the 1990s. Rice has been also imported in large amounts particularly since 1995 as many donor countries have provided rice aid. The difference between wheat and maize (and rice) is that the former is not the main rationing item in the DPRK while the latter is. It means that the purpose of grain import fundamentally changed before and after 1986: it was to diversify the country's food diets before 1986 while it has been to secure state food reserves for PDS rations since 1986. It would be quite strange if a government did not comprehend worsening food situation when it faced the difficulty in providing state food rations to the population.

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[342] Im Eul Chul (1999) and the ROK Ministry of Unification (1994)

Table 8-18. DPRK Grain Trade: 1975-2000

A. Quantity (1000 MT)

	75	76	77	78	79	80	81	82	83	84	85	86	87
Import	621	530	500	350	510	510	720	585	350	200	200	353	698
(maize)												55	90
(rice)					40							28	78
(wheat)	300	430	450	350	470	510	720	585	350	200	200	270	530
(other)	321	100	50										
Export	528	393	570	612	434	227	264	210	120	150	200	200	260
(maize)	200	300	300	200	200								
(rice)	328	93	270	412	234	227	264	210	120	150	200	200	260
(other)													
Balance	-93	-137	70	262	-76	-283	-456	-375	-230	-50	0	-153	-438

	88	89	90	91	92	93	94	95	96	97	98
Total	1081	466	596	1571	1154	1585	573	1010	1107	1451	1501
(maize)	190	296	264	247	587	876	244	110	85	654	596
(rice)		13	27	146	315	200	56	587	340	310	508
(wheat)	870	150	300	1175	166	439	258	100	216	57	200
(other)	21	7	5	3	86	70	15	213	466	430	197
Total	243	90	43	11	5	42	19			1	1
(maize)						39	11				
(rice)	243	90	43	11	5		2				
(other)						3	6			1	1
	-838	-376	-553	-1560	-1149	-1544	-555	-1010	-1107	-1451	-1500

B. Value (million US dollar)

	75	76	77	78	79	80	81	82	83	84	85	86	87
Total	95	86	76	56	97	97	158	120	68	38	36	53	91
(maize)					14							6	7
(rice)	54	74	70	56	83	97	158	120	68	38	36	4	14
(wheat)	41	12	6									43	70
(other)													
Total	126	59	117	171	115	98	119	77	35	40	50	44	61
(maize)	30	36	33	23	26								
(rice)	96	23	84	148	89	98	119	77	35	40	50	44	61
(other)													
	31	-26	42	115	18	1	-39	-43	-33	2	14	-9	-29

	88	89	90	91	92	93	94	95	96	97	98
Total	140	76	92	184	206	236	74	255	249	302	280
(maize)	28	45	40	32	90	122	34	18	15	109	84
(rice)		4	7	34	80	45	11	180	112	104	134
(wheat)	110	25	45	118	17	57	26	11	24	7	27
(other)	2	3	1	1	19	12	3	46	99	82	36
Total	51	18	7	1	1	5	2			0.09	0.09
(maize)						4	1				
(rice)	51	18	7	1	1						
(other)							1			0.09	0.09
	-89	-58	-85	-183	-205	-231	-72	-255	-249	-302	-280

Source) FAO Statistical Database

From the above discussion, it seems clear that, however inflated official (grain) production statistics, the DPRK government has been well aware of the country's deteriorating food situation since the mid/late 1980s.

8.5.3. Famine Relief: International Food Aid and PDS Coping Strategies

Now let us move to the issue of famine relief. There are no reports that the DPRK government provided relief grains during the famine period. In this respect, some might argue that the government paid little attention to save famine victims. But this argument does not seem wise for two reasons. First, all state policies during the famine period focused on maximising international food aid. Second, there existed systematic PDS coping strategies to minimise population loss during the famine period.

8.5.3.1. International Food Aid: National Coping Strategy I

An important aspect of the DPRK famine is that food import gradually increased during the famine period. And one of the most important famine policies in the DPRK was to maximise international food aid. Both facts make the DPRK famine quite different from those of many other socialist countries that blocked international aid and even exported grain to outside world during their famine periods.

Some might challenge this view on two grounds. First, compared with the 1991-93 level, the DPRK grain import was smaller during the famine period. Second, the import sharply fell when the famine first occurred in 1994. Given that the DPRK was already a net food importer since the mid 1980s, these trade data might be interpreted as showing that the government failed or ignored to increase food import during the famine period. But a closer look at the way the country procured foreign food in the 1990s suggests that the DPRK government made ongoing efforts to have more foreign food shipments even by compromising its political and military interests that had surpassed all other economic interests before the famine.

After the breakdown of the USSR, as mentioned already, the DPRK mainly depended on China for its grain import [Annex table 8-1]. It was an inevitable choice for the DPRK, which had financially defaulted in international market, in order to increase the import because China was the only country that applied concessional prices to the DPRK, reportedly one third of international prices.[343] For the same reason, however, the cessation of Chinese food supply in 1994 meant that the DPRK effectively lost its capability to procure foodgrains from abroad.

In this circumstance the DPRK government focused on international food aid. It asked the ROK and Japan to provide emergency food aid in early 1995 and launched an official appeal for international food aid shortly after the July/August 1995 flood. Since then all the DPRK policies have focused on having more food aid from abroad. By 1997 it had opened most of its country, except those areas that are bordered with South Korea and so militarily sensitive, to foreign aid workers and allowed them to have their own posts in Pyongyang. By 2001 it made the first diplomatic ties with many western donor countries, particularly EU countries such as Great Britain.[344] It also resumed peace talks with the ROK in return for its economic aid, which eventually led to the first South-North Korean Summit Meeting in July 2000. The government have even hinted that the country could swap military gains such as the development of nuclear weapons and long-range missiles with hard currency to boost its agricultural production and revive the economy.[345]

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[343] Noland (1997), p. 57

[344] Between 1995 and 1998 EU donated 123 million US dollar of food to the DPRK, appearing the third largest donor country in the world after the ROK and US that provided 273 and 171 million dollar respectively (the ROK Ministry of Unification: Sep. 1998). Taking into consideration the DPRK's military confrontation with the ROK and the US, those figures mean that EU countries were the most important countries to which the DPRK should normalise its diplomatic relation in order to secure international food aid. Indeed Kim Dong Su, a former DPRK diplomat in FAO, stated that the main purpose of the DPRK's diplomatic approach to EU countries was to have more food aid from them (North Korean Policy Trend, 1998 No.4: p. 49). Not surprisingly by 2001 the DPRK made normal diplomatic relation with most important EU countries, including Great Britain, France and Italy for the first time in its history.

[345] In 1999, for example, William Perry, US North Korea policy coordinator and special advisor to the President and the secretary of sate, found in his trip to Pyongyang:

...In its current circumstance of industrial and agricultural decline, the DPRK has on occasion indicated a willingness to "trade" addressing US concerns about its nuclear weapons activities and ballistic missile exports for hard currency. For example, the DPRK offered to cease its missile exports if the US agreed to compensate it for the foregone earnings from missile exports.... (Dr. William Perry, Review of United States Policy Toward North Korea: Findings and Recommendations, Washington, DC, 12 Oct 1999).

Table 8-19. Grain Import and International Food Aid: 1989-97

	Total Food Supply (million MT)	Net Grain Import (million MT)	Net Grain Import % of total food supply	International Food Aid (million MT)	International Food Aid % of total net import	International Food Aid % of total food supply
1989		0.38				
1990		0.55				
1991		1.56				
1992	8.61	1.15	13			
1993	8.73	1.54	18			
1994	8.10	0.56	7			
1995	7.17	1.01	14	0.32	32	4
1996	4.22	1.11	26	0.30	27	7
1997	3.57	1.45	41	0.84	58	24
1998	3.86	1.50	39	0.75	50	19

Source: 1. For total food supply, table 8-3

2. For net grain import, table 8-18

3. For international food aid, the ROK Ministry of Unification (17 Sep 1999)

Table 8-19 reports the results of these political and diplomatic efforts. In terms of absolute amount, the DPRK grain import reached peak in 1991 (normal year). In terms of the share in total food supply, however, it reached peak in 1997 (famine year). Moreover, the import tended to fall before the famine (1991-94) while it rapidly increased during the famine (1994-98). Most importantly, there was no food aid before 1995 while it accounted for more than 50 percent of total grain import in 1997-8.

In short, during the famine period the DPRK faced two fundamental constraints in grain import: 1) financial incapability for commercial grain import; 2) the cessation of concessional food supply from other socialist countries. Under these constraints the government made ongoing efforts to increase international food aid even by compromising its political and diplomatic interests.

8.5.3.2. PDS coping strategies: National Coping Strategy II

It may be impressive from humanitarian perspectives that the DPRK government made great efforts to have more food aid from abroad. But the reasons for these efforts are not necessarily humanitarian. We return to this issue in the final part of this section. But first we consider the roles of the aid during the famine period. How was it utilised by the government?

Fig 8-1 illustrates the supply patterns of PDS rations in the agricultural year of 1998 and of 1999. Note that the depicted line for 1998 does not include international food aid while that for 1999 does. By 1998 the DPRK government had provided FAO/WFP with monthly PDS rationing data that excluded international food aid channelled by PDS. In contrast, the data submitted in 1999 include the aid. Both lines have one difference and two similarities.

Look at the difference first. In 1998 there was a period that no PDS ration was supplied. But there was no such a period in 1999. Several factors could be attributed to this difference. Domestic production must be different; the authorities might have different supply schedules; the amounts and timings of before-harvest-grain-distribution might be different. But the main reason seems to be international food aid. During the famine period FAO/WFP mission teams persistently reported that domestic food reserves in the DPRK were usually depleted in March/April and then the country entirely depended on international food aid until new harvest was available. It means that, when international food aid was not counted, there would appear a period during which no PDS rations were supplied.

What is striking is that the duration of no PDS rations from domestic sources was quite long. In 1998 it was almost half a year: five months from April to June. Hence, if there were no international food aid, there must be massive increases in death rates in that year. However, as discussed in chapter 6, the DPRK Ministry of Foreign Affairs announced that crude death rate was 9.3 per thousand in 1998. Although it was considerably higher than 5.5 in 1993, the degree of mortality increase does not seem so paramount. Moreover, it was significantly lower than 11.6 per thousand, the estimated average death rate in 1994-99 based on official population statistics, suggesting that in 1998 the famine had already passed over its peak.

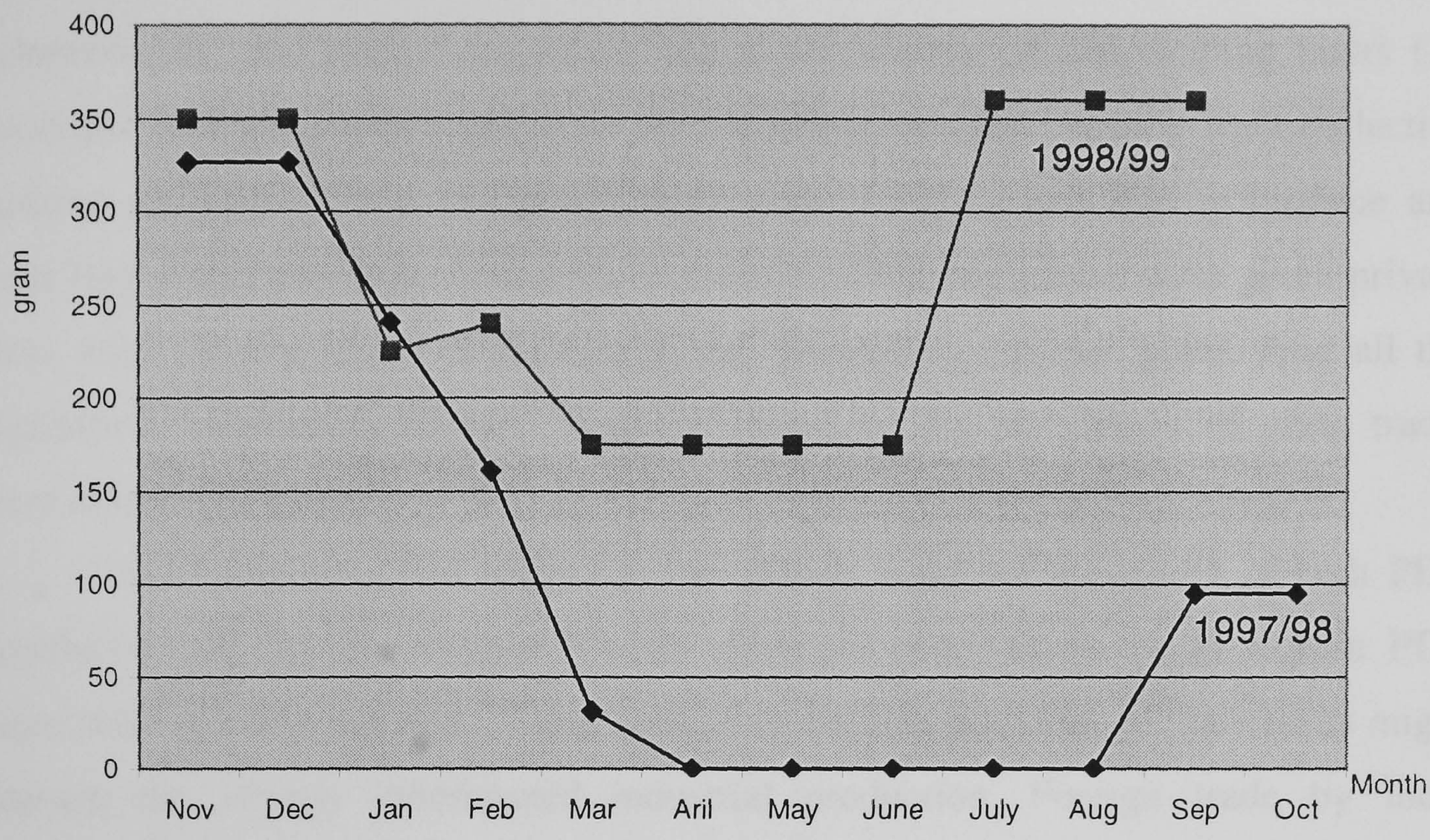
Undoubtedly these figures mean that international food aid played a decisive role to prevent the upsurge of death rates while no PDS ration was supplied from domestic sources in 1998. In this respect it is not surprising that the DPRK government made ongoing efforts to have more international food aid during the famine period.

What should be noted however is that international food aid constituted only a part of the strategies that PDS practised in order to cope with scarce state food reserves during the famine period.

Let us now consider the similarities of the two lines in fig.8-1. First, both lines show that PDS ration was extremely low: it did not reach 492 grams per person per day, the minimal food requirement by FAO, in any month in 1998 and 1999. This suggests that PDS population faced constant health risks in both years. Second, both lines divide a year into two seasons: 1) high season between July/Aug and Dec/Jan when harvest was available and so PDS ration was relatively more adequate; 2) lean season between Jan/Feb and June/Jul when PDS ration was extremely low. It means that the authorities set a recovery period in which people temporarily improved their worsening health statuses, rather than distributed available food evenly over the year.

This supply policy might be inevitable given the absolute shortage of state food reserves. Under this policy, however, PDS population should face life-threatening hunger in every lean season during the famine period. We believe that it was one of the reasons why PDS population appeared as the main famine victims.

Fig 8-1. Monthly PDS Rations: national average per person per day



Source) FAO/WFP(12 Nov.1998: 8 Nov.1999) and DPRK/UNDP(1998a)

An interesting point however is that PDS took various measures to make people survive lean season and thus prevent possible high increases in mortality rates during the famine period. Of them, undoubtedly getting and channelling international food aid was the most important. But there were other three distinctive measures as well. First, PDS provided so-called 'alternative' foods,[346] most of which were made of the mixtures of grass and small amount of grains or vegetables.

What has been certain are extensive Government efforts to mobilise the population to consume non-staple and 'alternative' foods, such as fruits, roots and tubers, mushrooms, leaves and grasses. Some estimates suggest that in 1995/96 almost 30 percent of calorie intake during the critical, lean supply, period came from such sources.[347]

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[346] The ingredients of alternative foods range widely and include, for example, acorn flour, sea and river-weed, edible grasses, ground corn cobs, etc. They often include a small amount of maize or wheat flour to facilitate digestion, though they are composed largely of cellulose, which has little nutritional value (FAO/WFP: 29 June 1999).

[347] FAO/WFP (6 Dec. 1996)

Second, the government encouraged local administrators and state firms to provide additional foodgrains to PDS population.[348] To do this provincial and even county administrators were empowered for the first time to carry out foreign food trade independently, and state firms were ordered to allocate official farming hours (20 hours per year per person) and lands for the employees and organise their collective farming activities. Third, the government allowed PDS population to produce and trade foodgrains privately. Like farm households, PDS population were given private plots with the maximum of 50 pyung and allowed to produce grain. And all the regulations concerning farmers' markets, including the prohibition of grain trade, were effectively lifted.

These measures had many adverse effects from the viewpoint of both PDS population and the government. Poorly made substitute-foods could expose PDS population to many diseases,[349] and increasing farming activities of state firms might damage the already deteriorated industrial production. Foreign trade by local administrators could hamper the central control over the economy. Nevertheless, these measures were taken simply because they could help PDS population to survive lean season to new coming high season.

From the above discussion two conclusions can be drawn. First, during the famine period PDS exercised various coping strategies to prevent possible high increases in mortality rates. Second, international food aid took a vital role in the strategies: hence the government made ongoing efforts to increase the aid. Surely both famine policies were unique in the DPRK in the sense that many other socialist countries failed to

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[348] For instance, Hwang Jang Yop, a former ideology secretary of Korean Workers Party, stated that in the mid 1990s the DPRK government effectively dismantled the responsibility of the central government to provide food rations to PDS population, announcing that food rations must be provided by the central government for one third of year, by local government or workplaces for another one third, and by PDS population for the remaining one third. This emphasis on local governments (enterprises) and PDS population themselves was also observed by many outside visitors (Lautz 1996; Natsios 1999).

[349] For example, a US congressman who visited country stated:

"So-called 'alternative food' is to blame for a lot of the problems. Everyone seems to be eating a mixture of corn, cut with a lot of dried leaves and twigs. That may fill your belly, but it robs you of your health. There is no 'alternative' to food...." (Deborah DeYoung, Epidemics Threaten North Korea, U.S. Congressman warns, 30 August 1999, Daily Report, Nautilus Research Institute)

organise appropriate famine relief programs and secure humanitarian aid from abroad during their famine periods.

8.5.4. Controlled and Effective Food Distribution

Consider finally the possibility of food distribution failures. During the famine period, as discussed already, there were significant differences between farm household rations and PDS rations. And these differences made PDS population suffer more from the famine. One could therefore argue that the government failed to distribute food evenly, exacerbating the famine. We would not challenge this argument. At the same time, however, we would point out that the uneven food distribution between farm households and PDS population was the result of well-designed food distribution policies to alleviate the famine: hence it is equally possible to argue that the government made no distribution failures.

8.5.4.1. Supply of Minimal Food Requirements to Farm Households : National Coping Strategy III

Table 8-20 presents the 1997 net harvest, which refers to the harvest after deducting before-harvest-grain distribution, as well as state grain collection and farm household allocations. The figures are interesting in several respects. First, the government did not procure grains from farm households in some regions. In North East and South East, for instance, it sold significant amounts of grains to farm households, instead of procuring their grains. Second, state grain collection/sale was carried out strictly according to regional production level: the more produced, the more collected. South Hwanghae, Pyongyang and Nampo, three provinces with the highest production per farmer, had the greatest state collection while South Hamgyung, North Hamgyung and Kangwon, three provinces with the lowest production per farmer, commonly saw state grain sale to farm households. Third, state grain collection/sale normalised regional differences in grain production so that farm household grain allocation did not differ greatly by regions. For instance, grain production per farmer reached 442 kg in South Hwanghae, more than five times 86 kg in South Hamgyung. Due to state

grain collection/sale, however, per capita farm household grain allocation dropped to 168 kg in South Hwanghae, which was not significantly different from 164 kg in South Hamgyung.

Table 8-20. Food Production, Procurement and Allocation to Farmers
With Provincial Breakdown: 1997

	1997 Net Harvest (1000 MT)	Government Collection (1000 MT)	Grain left in Village (1000 MT)	Per Farmer* harvest (kg)	collection (kg)	allocation (kg)
	(1)	(2)	(3) = (2)-(1)	(4)	(5)	(6)
Special Cities	195.6	110.1	85.5	372	210	163
Pyongyang	100.7	58.2	42.5	414	239	175
Kaesung	34.2	13.3	20.9	253	98	155
Nampo	60.7	38.6	22.1	414	263	151
North West	545.1	205.4	339.7	244	92	152
South Pyongan	250.1	114.1	136	299	136	162
North Pyongan	229.8	78.7	151.1	219	75	144
Chagang	65.2	12.6	52.6	189	37	152
North East	207	-57.6	264.6	134	-37	171
South Hamgyung	77.9	-71.4	149.3	86	-79	164
North Hamgyung	79.1	-0.5	79.6	161	-1	162
Ryanggang	50	14.3	35.7	339	97	242
South West	653.4	353.9	299.5	360	195	165
South Hwanghae	495.7	307.7	188	442	274	168
North Hwanghae	157.7	46.2	111.5	227	67	161
South East	46.9	-30.8	77.7	103	-68	171
Kangwon	46.9	-30.8	77.7	103	-68	171
DPRK Total	1648	581	1067	251	88	162

* The official provincial populations dated of 31 August 1999 are used to obtain per capita figures

Source) Annex table 8-4-A

As pointed out already, farm households are entitled to keeping their food rations from their production ahead of state collection: hence, when there is a national standard of state food ration, farm household grain allocation should not differ greatly

by regions. Clearly this entitlement provided a reason why farm household allocation did not have huge regional differences. But the above figures tell more than this entitlement factor does. According to the DPRK entitlement system, farm households are not entitled to purchasing grains from the government. Nevertheless, the government sold grains to farm households in North East and South West, particularly when PDS population in these regions suffered more from food shortages than farm households. Then, why?

It is important to keep in mind that farm household grain allocation includes not only their food rations but also other grain requirements for agricultural production such as seeds and animal fodder. It means that state grain sale to farm households was mainly intended to meet the requirements for agricultural production. Indeed South Hamgyung in North East, the greatest beneficiary of state grain sale to farm households, saw that the production was too low to provide even farm household rations, not mentioning grain requirement for agricultural production. In this province the 1997 net harvest was mere 86 kg per farmer while the norm of farm household ration in that year was 135 kg per head (or 370 grams per day) [see table 8-14]. Owing to state grain sale, however, farm households received 164 kg per head so that they secured not only their assigned food rations but also some grains for the 1998 production. It was also the case in Kangwon in South East, another main beneficiary of state grain sale to farm households.

The implication of this distribution policy was clear: during the famine period the government attempted to minimise the adverse impacts of food shortages on agricultural production and thus provided 'minimal food requirements for production', including farm household rations, seeds and fodder, to all farm households across the country. As the result, food was quite evenly distributed among farm households, in spite of huge variations in regional production.

Undoubtedly this policy helped boost grain production and so alleviate the famine in rural areas. A negative aspect of the policy however is that it made state grain collection extremely volatile by regions: hence PDS population in some regions, who were entirely dependent on PDS rations, should be quite vulnerable to food shortages. How did the government respond to this negative effect?

Table 8-21. Food Procurements and PDS Rations to Non-Farmers

With Provincial Breakdown: Nov.1997-Feb.1998

	Government Procurement (1000 MT)	PDS Food Rations to Non-farmers (1000 MT)	Local PDS Stock Changes (1000 MT)	Per Non-farmer*	
				Procurement (kg)	ration (kg)
	(1)	(2)	(3) = (1)-(2)	(4)	(5)
Special Cities	110.1	111.5	-1.4	30	30
Pyongyang	58.2	90.1	-31.9	21	32
Kaesung	13.3	6.6	6.7	53	26
Nampo	38.6	14.8	23.8	58	22
North West	205.4	112.0	93.4	43	23.7
South Pyongan	114.1	48.7	65.4	50	22
North Pyongan	78.7	33.0	45.7	50	21
Chagang	12.6	30.3	-17.7	14	34
North East	-57.6	104.8	-162.4	-13	24
South Hamgyung	-71.4	44.2	-115.6	-35	22
North Hamgyung	-0.5	43.6	-44.1	0	25
Ryanggang	14.3	17.0	-2.7	26	31
South West	353.9	57.4	296.5	160	26
South Hwanghae	307.7	33.4	274.3	263	29
North Hwanghae	46.2	24.0	22.2	44	23
South East	-30.8	18.3	-49.1	-30	18
Kangwon	-30.8	18.3	-49.1	-30	18
DPRK Total	581	404.0	177	36	25

Source) Annex table 8-4-B

8.5.4.2. Centrally Controlled Food Distribution Among PDS Population:

National Coping Strategy IV

Table 8-21 reports food distribution between November 1997 and February 1998 among PDS population. The figures are as interesting as those for farm households. As expected, there were huge regional differences in state grain collection. In South Hwanghae, for instance, state grain collection reached 263 kg per PDS population: hence, even without central intervention, the province was able to supply 'minimal

food requirement for human survival' set by UN, 167 kg per person per year. In South Hamgyung, however, there was state grain sale to farm households so that the provincial grain reserve fell by 35 kg per PDS population. Without central intervention, therefore, the province would not be able to provide any PDS rations.

Table 8-22. Food Production, Distribution and Transfer by Province: Nov.1997-Feb.1998

(kg)

	Per Head Harvest (1)	Per Head Distribution (2)	(1) - (2)
[Group I]			
South Hwanghae	216	111	105.4
Nampo City	75	59	15.4
South Pyongan	81	67	13.4
North Pyongan	88	76	11.4
Kaesung City	89	84	4.9
Average of Group I	110	79	30
[Group II]			
North Hwanghae	91	93	-2.0
Pyongyang City	33	45	-12.4
Ryanggang	71	85	-14.4
Chagang	53	71	-17.7
North Hamgyung	36	60	-24.4
Kangwon	32	73	-41.0
South Hamgyung	27	70	-43.5
Average of Group II	44	72	-28

Source) Annex table 8-4-A and B

Interestingly however there were no such huge provincial differences in the actual PDS rations between November 1997 and February 1998. It is true that those provinces in which no grain collection from farm households was made, notably South Hamgyung in North East and Kangwon in South East, provided significantly lower PDS rations than other provinces. But the differences were not so paramount as

in state grain collection. It means that the central government did intervene in provincial food supply by redistributing state food reserves among provinces.

8.5.4.3. Regionally Even Food Distribution

Because the government supplied minimal food requirements to all farm households across the country and mitigated regional differences in state food reserves, regional food distribution was made relatively evenly.

Table 8-22 illustrates this point. Between November 1997 and February 1998 the DPRK provinces were divided into two groups. Group I included mainly southern/ western provinces where per head grain production was relatively higher. In contrast, group II consisted of northern/eastern provinces that suffered lower grain production. Between November 1997 and February 1998 group I produced 110 kg of grain per head on average and, of the production, distributed 79 kg for local residents, including both farm households and PDS population,. The remaining 30 kg went under the control of the central government, being subject to inter-provincial grain transfer. Using this inter-provincial grain transfer the central government provided additional grain supply, 28 kg per head, to the residents in group II that produced only 44 kg per head. As the result, those who resided in group II were also distributed 72 kg per head, which was not greatly different from 79 kg in group I.

8.5.4.4. Controlled and Effective Distribution of Food

The above discussions can be summarised as follows. First, in the agricultural year of 1998 the government provided all farm households with minimal food requirements for agricultural production, regardless of their production and food situations. The purpose of this policy was to minimise the adverse impacts of food shortages on production. Second, this policy brought about even distribution of available food among farm households but at the same time it caused the problem that state grain collection varied immensely by regions: hence some provinces could not afford to provide PDS rations at all. Third, to solve the problem the central government redistributed state food reserves among regions. Fourth, this intervention did not lead to regionally even distribution of food among PDS population but still mitigated huge

differences in regional food situations. Fifth, consequently in overall sense food was relatively evenly distributed among regions, despite that there were huge differences in regional food production.

Those five facts suggest that the DPRK government developed a well-designed distribution policy to increase grain production and at the same time alleviate the famine. It is this distribution policy that made the significant differences between farm household rations and PDS rations. In this regard it is difficult to say that the government failed to distribute food appropriately simply because it provided more favourable food supply to farm households so that PDS population relatively suffered more from the famine.

8.5.5. National Coping Strategies and Famine in Slow Motion

In this section we have identified three common policy mistakes that many socialist countries made during their famine periods, and discussed whether the DPRK government made similar mistakes. An interesting point is that, when we have studied various factors possibly leading to such policy mistakes, we have paradoxically found that the DPRK government developed well-designed national coping strategies during the famine period. Now let us describes the strategies as a whole.

Concerning the famine policies the DPRK government seemed to have two objectives: 1) to prevent further production failures in agriculture; 2) to minimise the loss of (urban) PDS population. Because the famine was caused by the dramatic decline in food production, the most effective way to ease the famine was to increase the production. But the problem was that the famine was already damaging the production in terms of weakening physical conditions of farmers and the shortages of seeds and animal fodder and so forth. To solve this problem, the government provided farm households with minimal food requirements for agricultural production, including farm household rations, seeds and fodder, to all farm households across the country. Owing to this policy farm households received more favourable and evenly distributed food rations during the famine period than their counterparts in industry.

But this strategy made state grain collection/PDS food reserves extremely vulnerable to ongoing production failures. The vulnerability was particularly severe in

those provinces where grain production was far short of PDS ration requirements. To minimise this adverse impact the government took three measures.

First, it mitigated the differences in provincial PDS food reserves by organising inter-provincial grain transfer. Second, a variety of PDS coping strategies were developed, including the supply of alternative foods and international food aid. Third, the government implemented a variety of economic reforms to provide people with the opportunities to get additional food other than state rations. For instance, private grain production was tolerated, farmers' markets were deregulated and local administrators and state enterprises were given responsibilities to feed the population.

In section 5.3 we quoted an international aid worker saying that the DPRK famine claimed relatively little lives but caused serious long-term health risks to the whole population because it happened in a highly organised country. The above national coping strategies demonstrate what this highly organised country means. That is, the government tightly controlled food production and distribution, developing well-designed coping programs to prevent people from perishing away even during the period of great hunger. We believe that these national coping strategies constituted the basic reason why there was 'famine in slow motion' in the DPRK.

The final question is: why was the DPRK government so interested in alleviating the famine? Clearly it is not because the government was humanitarian. For the last five decades it has been regarded as one of the worst governments in the world in terms of human right violation. And this violation got reportedly worse during the famine period.[350] The real reason seems rather obvious: the famine hit urban population who was vital for the DPRK regime survival.

From the very beginning of its establishment the DPRK government controlled urban population using state food ration. There were no opportunities for urban population comprising around 60 percent of total population to obtain foodgrains except state rations. Those who refused to work in the workplaces assigned by the authorities had their rations immediately ceased. Even when they travelled, they should bring rationing coupons to buy food: hence the authorities

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[350] Natsios (1999)

controlled every population movement in the country. It is this control power of the government that has maintained socialist regime in the DPRK.

But the famine decisively undermined the control power. In search of food urban population travelled all across the country without official permission and even fled to neighbouring countries. Industrial workers left their workplaces for private farming or profit seeking activities in farmers markets. It means that the famine was directly threatening the stability of the regime. It would be quite strange in this situation if the government ignored the famine, making no response or simply attempting to hide its existence from outside world.

8.6. Conclusion

In this chapter we discussed the causation, patterns and features of the 1994-99 DPRK famine, finding that the famine was unique in all its aspects in comparison with those in other socialist countries. The discussion of this chapter can be summarised as follows.

1. The famine was FAD famine. Before and during the famine period there was a clear FAD the degree of which was much greater than those in the 1959-61 Chinese famine and the 1932-33 Soviet famine. And FAD pre-dated and triggered every stage of the famine, generating its geographical movement. Regional food availability also corresponded to the regional distribution of famine victims. Above all, in the last stage of the famine FAD was so great that there was no feasible division of available food to prevent the famine.

2. Although FAD was the causation of the famine, it had two distinctive features that can not be explained by FAD. One is that it hit mainly urban industrial population in north eastern part of the country. Another is that it did not cause eruptive population losses in a relatively short space of time. Rather it imposed a long-term health risk on the whole population. In this sense the famine was urban famine as well as famine in slow motion.

3. In the DPRK rationing system, farm households have stronger entitlement than their counterparts in industry in two respects. First, farm household rations are relatively safer from adverse changes in production. Second, farm household rations are also safer from adverse seasonal changes in food situation. Due to this fact farm household received far greater and more stable rations than PDS population during the famine period. It was the basic reason why the famine hit mainly urban areas (PDS population).

4. Despite this overall trend, however, farm households received relatively lower rations in the agricultural year of 1996, which drove them into main victims in the second stage of the famine. It was because the July/August 1995 flood mainly destroyed the grain reserves of farm households, hence adversely affecting their rations in that year.

5. Because the famine hit mainly urban (PDS) population who were important for the regime to survive, the government's attitudes to famine was quite different from those of other socialist governments. The government was well aware of the country's real food situation from the beginning of the famine, was concerned about famine relief and particularly made optimal food distribution policies in order to ease the famine. In this sense there were no such policy failures in the DPRK famine as frequently found in many other socialist famines.

6. During the famine period the government developed national coping strategies that have two purposes: 1) increasing grain production; 2) at the same time minimising the population losses caused by the famine. To achieve the first purpose the government supplied 'minimal grain requirement for agricultural production' to all farm households evenly across the country. Due to this policy, however, there were great shortages of available food for PDS population and moreover the shortages varied greatly among regions. To mitigate the problems, on the one hand, the government emphasised the inter-provincial grain transfer, reducing the regional differences in PDS rations. On the other hand, it developed PDS coping strategies consisting of four parts: 1) maximising international food aid; 2) providing alternative food; 3) emphasising the responsibility of local

administrators and state firms to feed PDS population; 4) expanding the opportunities for the population to have additional food

7. The national coping strategies had many problems, including the worsening health status of the population. But it did help people survive lean season, thus reducing the population losses during the famine period. It was the basic reason why the famine did not cause the sharp increase in the number of famine deaths, in spite of massive scale FAD, and resulted in the long-term health crisis of the population.

Annex Table 8-1. DPRK Grain Trade: USDA Estimate

(MT)

	1985	1990	1991	1992	1993	1994	1995	1996
Rice:								
China				16	12,503	28,549	2,396	34,000
Hong Kong			800					
South Korea			5,000				150,000	
Thailand			51,594	10,000	100,000		177,000	75,000
Vietnam			103,606					67,000
Other								38,950
Maize:								
Yugoslavia								
China		264,609	216,790	586,577	876,218	209,478	9,000	139,474
Thailand	5,000							
USA							85,500	
Barley:								
Australia								
China				200	276	100	976	
Hong Kong			515					
Syria							20,000	
Wheat:								
Australia	12,600	188,201	203,963	63,000			83,000	
Canada			454,988		293,315			
China			1,230	60,314	37,374	8,966		239,655
Hong Kong			198	102	147	69		
India			145,668					14,000
Turkey				180,235				
EU countries		71,781					33,000	
Russia								
Yugoslavia			75,012					
Other						100,000		120,000
Total	19,958	524,640	1,259,893	923,650	1,349,610	401,299	893,707	968,723

Source) Kim, Lee and Sumner (1999)

Annex table 8-2. Per Capita Provincial Rice and Maize Production: 1989-97

(Kg)

	Ave. 89-92	93	94	95	96	97	Ave. 93-97
Special Cities	213	247	147	102	76	79	130
Pyongyang	168	201	117	77	58	58	102
Kaesung	448	478	179	209	119	149	227
Nampo	274	315	246	150	123	123	191
North West	458	517	417	152	112	133	266
S. Pyongan	492	555	467	188	119	146	295
N. Pyongan	554	640	464	148	123	144	304
Chagang	174	165	191	69	69	78	114
North East	252	153	184	110	70	44	112
S.Hamgyung	329	209	260	132	84	40	145
N.Hamgyung	213	107	121	107	68	53	91
Ranggang	47	63	63	31	16	31	41
South West	764	846	534	321	193	290	437
S.Hwanghae	925	1049	691	418	244	388	558
N.Hwanghae	549	575	324	192	126	159	275
South East	276	238	245	138	61	54	147
Kangwon	276	238	245	138	61	54	147
DPRK Total	395	410	314	159	106	122	222

* Per capita production = each year's grain production/the 1993 population

Source) 1. For the 1989-97 provincial grain production, DPRK/UNDP (1998a)

2. For the 1993 population, DPRK Central Bureau of Statistics (1995)

Annex table 8-3. Reported DPRK Food Rations

A. Nov. 1995 – Oct. 1996

(gram per person per day)

	Nov.95-Mar.96	Apr.96-June.96	Jul.96-Oct.96
Non-farmers	452	250-300	200
Farmers	100 kg (below half of normal level) for annum		

*In May 1996 many farmers were reportedly included in the PDS

*In May 1996 potatoes were included in food items rationed by the PDS

*In August 1996 maize was harvested early before normal harvest season, being channelled into PDS

Source) FAO/WFP (3 May 1996: 6 September 1996: 6 December 1996)

B. Nov. 1996 – Oct. 1997

	Nov.-Dec.96	Jan.97-June.97	Jul.97-Oct.97
Non-farmers	450-500	100-200	0
Farmers	around 80 kg for annum*		

* 40 percent of normal allocation (200 kg).

Source) FAO/WFP (6 December 1996: 3 June 1997: 11 September 1997)

C. Nov. 1997 – Oct. 1998

	Nov.-Dec.97	Jan.98	Feb.98	Mar.98	Apr.-Aug. 98	Sep.-Oct.98
Non-farmers	400	300	200	100	0	100
Farmers	130-160 kg (135 kg as norm) for annum					

Source) FAO/WFP (June 1998: 12 November 1998)

D. Nov. 1998 – Sept.1999

	Nov.-Dec.98	Jan.99	Feb.	Mar.-June	July-Sept.99
Non-farmers	350	225	240	175	360
Farmers	146 kg for annum				

Source) FAO/WFP (8 November 1999)

Annex table 8-4. Grain Production, Procurement and Allocation to Farm Households and PDS Population by Province: Nov.1997-Feb.1998

A. Farm Households

	1997 Production (1000 MT)	Consumption before Oct. (1000 MT)	1997 Net Harvest (1000 MT)	Grain left in Village (1000 MT)	Government's Procurement (1000 MT)	Farm Population of 31 Aug.1999 (thousand)	Per Farmer		
							Harvest (kg)	procurement (kg)	grain allocation (Kg)
	(1)	(2)	(3) = (1)-(2)	(4)	(5) = (3)-(4)	(6)	(7)= (3)/(6)	(8)= (5)/(6)	(9)= (4)/(6)
1. Special Cities	255	59.4	195.6	85.5	110.1	525	372	210	163
Pyongyang	131.2	30.5	100.7	42.5	58.2	244	414	239	175
Kaesung	44.6	10.4	34.2	20.9	13.3	135	253	98	155
Nampo	79.2	18.5	60.7	22.1	38.6	147	414	263	151
2. North West	710.5	165.4	545.1	339.7	205.4	2232	244	92	152
South Pyungan	326	75.9	250.1	136	114.1	837	299	136	162
North Pyungan	299.5	69.7	229.8	151.1	78.7	1050	219	75	144
Chagang	85	19.8	65.2	52.6	12.6	345	189	37	152
3. North East	269.8	62.8	207	264.6	-57.6	1546	134	-37	171
South Hamgyung	101.5	23.6	77.9	149.3	-71.4	909	86	-79	164
North Hamgyung	103.1	24	79.1	79.6	-0.5	490	161	-1	162
Ryanggang	65.2	15.2	50	35.7	14.3	148	339	97	242
4. South West	851.6	198.2	653.4	299.5	353.9	1816	360	195	165
South Hwanghae	646.1	150.4	495.7	188	307.7	1122	442	274	168
North Hwanghae	205.5	47.8	157.7	111.5	46.2	694	227	67	161
3. South East	61.1	14.2	46.9	77.7	-30.8	455	103	-68	171
Kangwon	61.1	14.2	46.9	77.7	-30.8	455	103	-68	171
DPRK Total	2148	500	1648	1067	581	6574	251	88	162

Source) 1. For column 6, the DPRK's submission to FAO/WFP (Nov.1999)
2. For all other columns, the DPRK's submission to DPRK/UNDP (1998a)

B. PDS Population

	Government Procurement (1000 MT)	Food Supply By PDS (1000 MT)			Provincial Stock Changes In PDS (1000 MT)	Non-Farm Population of 31 Aug.1999 (thousand)	Per Non-Farmer (kg)		
		PDS ration	other purposes	total			procurement	food ration	stock change
	(1)	(2)	(3)	(4)	(5) = (1)-(4)	(6)	(7) = (1)/(6)	(8) = (2)/(6)	(9) = (5)/(6)
1. Special Cities	110.1	111.5	21.9	133.4	-23.3	3719	29.6	30.0	-6.3
Pyongyang	58.2	90.1	5.8	95.9	-37.7	2800	20.8	32.2	-13.5
Kaesung	13.3	6.6	4.8	11.4	1.9	251	53.0	26.3	7.6
Nampo	38.6	14.8	11.3	26.1	12.5	667	57.8	22.2	18.7
2. North West	205.4	112.0	43.9	155.9	49.5	4725	43.5	23.7	10.5
South Pyungan	114.1	48.7	24.0	72.7	41.4	2263	50.4	21.5	18.3
North Pyungan	78.7	33.0	15.8	48.8	29.9	1575	50.0	21.0	19.0
Chagang	12.6	30.3	4.1	34.4	-21.8	887	14.2	34.2	-24.6
3. North East	-57.6	104.8	29.6	134.4	-192.0	4316	-13.3	24.3	-44.5
South Hamgyung	-71.4	44.2	11.9	56.1	-127.5	2023	-35.3	21.8	-63.0
North Hamgyung	-0.5	43.6	10.3	53.9	-54.4	1737	-0.3	25.1	-31.3
Ryanggang	14.3	17.0	7.4	24.4	-10.1	555	25.7	30.6	-18.2
4. South West	353.9	57.4	58.5	115.9	238.0	2208	160.3	26.0	107.8
South Hwanghae	307.7	33.4	32.9	66.3	241.4	1168	263.5	28.6	206.7
North Hwanghae	46.2	24.0	25.6	49.6	-3.4	1040	44.4	23.1	-3.3
3. South East	-30.8	18.3	11.1	29.4	-60.2	1012	-30.4	18.1	-59.5
Kangwon	-30.8	18.3	11.1	29.4	-60.2	1012	-30.4	18.1	-59.5
DPRK Total	581	404.0	164.0	568.0	13.0	15980	36.4	25.3	0.8

Source) 1. For column 6, the DPRK's submission to FAO/WFP (Nov.1999)
2. For all other columns, the DPRK's submission to DPRK/UNDP (1998a)

IX. The Food Crisis and Institutional Changes in Agriculture: From 1987 to Present

9.1. Introduction

In this chapter we consider the final issue of the recent food crisis in the DPRK: has it changed and will it change the DPRK agriculture?

Compared with the previous two issues, this final issue has several difficulties to deal with. First, although there were reportedly many important changes in the current DPRK agricultural institutions during the food crisis, the government made little official announcements about the changes. It is therefore unclear in many cases if the changes were real institutional changes or simply the signs that the current institutions did not work properly. Second, there were indeed made many contradictory changes. For instance, on the one hand, the government widely tolerated private food production and trade during the food crisis. Hence, as we shall see below, some outside organisations have argued that private plots and farmers markets have appeared as the two main food sources for ordinary DPRK households, being far more important than state food ration. It is however also true that the government took frequent actions to control and discourage private food production and trade. In this respect it is difficult to judge what was the genuine trend during the food crisis – the changes, say, increasing private food production and trade or the counter-changes, say, the government's actions to prevent them. Third, the main information source about the institutional changes in the DPRK agriculture during the food crisis was media reports, particularly western media reports. As in many other DPRK issues, however, the media reports were in some cases not accurate, contradictory to each other, and too vague to have important implications from.

Due to these difficulties we do not attempt in this chapter to make any robust arguments about the institutional changes caused by the food crisis. Instead, we simply review all the reported changes, identify what is important, and what is not, in terms of the current institutions, and discuss the possible government's intentions to

make such changes. The conclusion of this chapter is simple: it is too early to judge whether the food crisis has really changed the DPRK agriculture, in other words, whether it has made the current agricultural institutions collapse and thus made it inevitable for new institutions such as market institutions to replace the current ones.

To reach this conclusion we examine how the food crisis has influenced four basic current agricultural institutions: centralised administrative planning in agricultural production, state food rationing, state grain marketing and supplementary food supply channels. Above all, section 9.2 identifies the strengthening of the existing supplementary food supply channels with increasing private food production and trade, discussing whether the changes mean real market reforms. In section 9.3 we study the weakening of state food rationing and consider the possibility that the rationing system will be abolished. Section 9.4 examines the new sub-team contract system in which farm households could keep a share of their surplus grains, but discuss whether it really means the end of state grain marketing that the government collects all surplus grains from producers. Section 9.5 deals with two seemingly contradictory changes in the ways the government controls agricultural production: 1) the liberalisation of farm operations from agricultural administrative organisations; 2) but at the same time the intensified central control within agricultural administrative organisations. In section 9.6 we summarises this chapter by presenting two extreme views about the impacts of the food crisis on the current DPRK agricultural institutions: one view that the crisis changed the institutions from the bottom, and another view that it did not make any significant changes.

9.2. Private Food Production and Trade: Prelude to Market Reform?

Perhaps the most visible change in agriculture during the food crisis was that private food production and trade flourished. According to the survey by the ROK Ministry of Unification (Dec. 1998), for instance, the DPRK defector families purchased 60 percent of their staple foodgrains from farmers' markets in 1998. The survey by KBSM (1998) also shows that the DPRK food refugee families had almost entirely relied for their food consumption in 1995-97 from private channels such as private plots and farmers' markets. It is of course difficult to say that these figures reflect the

Table 9-1. Policy Changes on Households' Private Plots during the Food Crisis

	tut-bat for farm households	tut-bat (or buup-bat) for PDS population	teogi-bat
Definition	3-50 pyung per farm household to grow vegetables	50-100 pyung per the employee of state firm to collectively grow grain	illegal private plots for individuals or groups to privately grow grains (mainly maize and beans)
before 1982	existed but not allowed to grow grain	not existed	not existed
1982	-	introduced for some state firms	-
1987	tolerated to grow grain	Official order for state firms to allocate 50-100 pyung of land and 20 hours of farming hours per their employee	tolerated
1989	-	-	prohibited
1992	so-called "anti-socialist activities breaking-up groups" were organised to control increasing illegal private plots and food trade		
1993	effectively tolerated for any private grain production in tut-bat, buup-bat and even teogi-bat		
1995	-	expanded to army (100 pyung per military family and 40 peyung per soldier)	-
2002	-	-	confiscated more than 30 pyung per person and redistributed it for state firms as their buup-bat

Source) see text

Table 9-2. Policy Changes on Farmers' Markets during the Food Crisis

Definition	Markets to circulate the products from the private plots of farm households. Grains and industrial products not allowed to be traded. City/County Administration and Economy Committee being in charge of establishing the markets and overseeing their operations. But market prices being solely dependent on supply and demand
before 1959	daily market in every county (rural area) and labour district (city)
1959-1981	10-days-market (1st, 11th, and 21st every month), no market in Special Cities including Pyongyang
1982	daily market. new markets opened in special cities
1984	the government's order to open 1-2 additional market in every county, increasing the number of market to 3-4 per county
1987-89	the government's over the number and operation of the markets, closing down unofficial markets, transforming daily markets into weekly markets in 1987 and into 10-days-market again in 1989
1989-93	markets tended to be transformed into black market called 'yudong-jang [floating market]' where sellers constantly moved to escape state control. To control black markets, "anti-socialist activities breaking-up group" were organised in 1992
1993	market liberalisation. 10 days market were transformed into daily markets. All food items, including grains, were effectively allowed to trade.
1994-1998	the number of markets increased to 300-350, and trading items expanded to all commodities including even grains and industrial products
1999	Kim Jong Il ordered to punish illegal market trade and got people from the markets to their work places
2002	prohibited grain trade again

Source) see text

situation of the ordinary DPRK households correctly because, as discussed in chapter 7, the refugee families are usually those with the weakest entitlements in the DPRK. Nevertheless, given that virtually all food supply had been previously provided by the government, both figures seem enough to show that private production and trade was increasingly important during the food crisis.

Increasing private food production and trade do not mean that the country gave up collective farming and state food rationing. Rather, it means that the government liberalised all farming and trading activities outside official food production and distribution. As discussed in chapter 2 and 4, the DPRK agricultural institutions have entailed supplementary food supply channels, including farm households' private plots, farmers' markets and the food production facilities of state firms, through which people have obtained additional food supply other than the official one. During the food crisis the government implemented several important policies to strengthen those supplementary food supply channels and thus effectively liberalise all private food production and trade. They include: 1) allocating private plots for PDS population (state firms); 2) allowing people to cultivate foodgrains in their private plots; 3) tolerating illegal private plots; 4) encouraging farmers' markets and tolerating illegal market grain trade.

First of all, the government institutionalised for PDS population (state firms) to have private plots and produce grains in their plots. Until the 1970s, although state firms had some food production facilities such as meat factories, they had no lands for grain production. But the situation was changed in the autumn of 1982 when the government allowed PDS population to collectively cultivate new lands and grow some minor grains, mainly beans, by their firms. By the early 1980s the share of rice and maize had risen up to 85 percent of the country's grain production while the import of wheat and other minor grains had continually fallen [see table 6-7 in chapter 6 and 8-18 in chapter 8]. Consequently the country's food diet had been increasingly dependent on only rice and maize. In this circumstance the government allowed PDS population, who had entirely relied on PDS rations, to privately grow some minor grains other than maize and rice and diversify their food diets. Lee Min Bok, a defector who had been an agronomist in the DPRK, described the policy as follows:

In this circumstance Kim family made an order in the autumn of 1982 to collectively, not individually, cultivate new lands and carry out side-farming, supplementing official food supply and improving food diet. The order gave the people, who had eaten only maize and *doenjang* [traditional Korean cuisine] made of maize, the rights to eat five-grains and *doenjang* made of beans.... As the people acknowledged that the products from collective side-farming directly belong to them, they were not only eager for the farming but also gradually started individual side-farming.[351]

These private plots were officially incorporated into the existing supplementary food supply channels in 1987 when the government ordered all state firms to allocate 50-100 pyung of land and 20 hours of farming hours per employee, allowing their employees to produce grains for their own consumption.[352] And the purpose of the plots was changed into compensating for the reduction of state food rations: hence it was tolerated to grow maize, one of two staple grains rationed by the government, in the plots. In February 1995 private plots were also given to military population, 100 pyung per the family of military personnel and 40 pyung per soldier, and consequently the whole PDS population had their own plots.[353] And finally the private plots of PDS population were approved as an economic institution by the newly adopted Socialist Constitution of September 1998. Until 1998 the DPRK Constitution had not recognised the private plots of PDS population by stipulating that only farm households had private plots called *tut-bat*. But the new Constitution deletes this qualification for having private plots, enabling the whole population to have them.[354]

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[351] Lee, Min Bok (1996), p.95-96
[352] Naewae News Agency (1995), p. 230
[353] Oh, Gyung Chan (1997), p. 142
[354] Jang, Myung Bong (1998). The DPRK Constitution of 5 September 1998 reads:

article 24: Private property is the property of citizens for their individual and consumption purposes.
..... The products from individual sideline activities, including those from *tut-bat*, and income from other legal economic activities shall also belong to private property (the DPRK Constitution of 5 September 1998 available from the ROK Ministry of Unification web site: http: //www.unikorea.go.kr/kr/unipds/unipds_n_law.php?cur_page=2& pdm=&pmd=view&num=1)

In contrast, the DPRK Constitution before 5 September 1999 reads in the same article:

article 24: Private property is the property of citizens for their individual and consumption purposes.
..... The products from individual sideline activities, including those *from cooperative farmers' tut-bat* shall also belong to private property. (the DPRK Constitution before 5 September 1998 available from Chosun Shinbo [People's Korea] web-site: http://www.korea-np.co.jp/pk/ 062nd_issue/98092413.htm). (italics added)

Secondly, the government allowed both PDS population and farm households to grow grains in their private plots. Until the 1970s farm households' private plots had been allowed only for the cultivation of vegetables, as proclaimed by the 1958 Standard Charter of Agricultural Cooperative.[355] As mentioned above, however, the private plots of PDS population were mainly introduced for the cultivation of grains. In particular, maize production was effectively allowed in the plots in 1987. Due to this change farm households also have been allowed to grow any foodgrains in their plots since.

Thirdly, the government tolerated illegal private plots called *teogi-bat*. Illegal plots reportedly first appeared in the late 1980s when some individuals in urban areas cultivated unused lands near their residences or workplaces without official permission mainly for their own food consumption. However, as food situation worsened in the early 1990s, virtually the whole population, including individual farm and non-farm households, cooperative farms and state firms, set out to expand their private plots without official permission; and consequently there appeared various forms illegal plots, *teogi-bat*, that were regularly cultivated individually or collectively in hillsides, riversides and mountains. The scale of *teogi-bat* reportedly grew up to many thousand pyung per household, and it was frequently reported that some households conducted commercial farming activities using their *teogi-bat* during the food crisis.

> ...So-called teogi-bat is the unofficial form without the government's permission. It is the form of land that individuals privately cultivate in mountains, riversides and other areas without roads and railways, being called '*sotoji*' according to regions....Choi Dong Cheol, the defector who had worked in 4.25 Tobacco Farm in Onsung, North Hamgyung, stated that the size of teogi-bat he himself had managed in North Korea was around 1,000 pyung in which he had produced about 400 kg of maize, 100 kg of *Judan*-bean and 150 kg of *Dubu*-bean. Lee, Min Bok, another defector also said that an average farm member could produce 200 kg of foodgrain when he spent 2-3days in his teogi-bat while he received only 180 kg of food grains for the 356days of work in cooperative farm.[356]

Fourthly, the government encouraged farmers' markets and tolerated (illegal) market grain trade. Since private grain trade was prohibited in 1957, the role of farmers' markets had been reduced to circulating the agricultural products from farm

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[355] see Section 4.2.4 in chapter 4.

households' private plots, and their operations had been discouraged until the 1970s. During this period farmers' markets were forcefully transformed into 10-days-markets, and those in special cities such as Pyongyang were closed. Paralleled with the introduction of the private plots of PDS population, however, the government began to revive farmers' markets from the early 1980s. In 1982 the existing 10-days-markets were changed into daily markets with greater scales, and those in special cities were allowed to reopen.[357] In May 1984 additional markets were allowed to open in most counties so that the number of markets reportedly increased up to 3-4 per county.[358] In particular, the government began to tolerate private grain trade in farmers' markets in the early 1990s. Initially market grain trade appeared only in some special cities such as Nampo where state food rations were delayed due to overall food shortages and transportation problems. However, as it was widely acknowledged among the public that the government did not punish the trade, they spread to the whole country between 1994 and 1996.[359] As a result, farmers markets appeared as the most important institution in which people obtained foodgrains other than state rations during the food crisis. According to the survey by the ROK Ministry of Unification (Dec. 1998), the number of farmers markets reached 300-350 in 1998, covering all counties in the DPRK; the trading items expanded from traditional agricultural products from farm households' private plots to foodgrains and industrial products the trade of which had been strictly prohibited before; and their participants varied from ordinary farm households to Korean-Chinese professional merchants.

Increasing private food production and trade were undoubtedly important changes in the DPRK agricultural institutions in which the government is supposed to control all food production, distribution and consumption. In particular, Jeong Jang Si, the head of agricultural department in the DPRK Agricultural Commission, announced on 24th November 1997 that the country would introduce some market mechanisms in agriculture, including both the liberalisation of small-scale agricultural markets and the overall price reforms of agricultural products.[360] In this respect one could think

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[356] Oh, Gyung Chan (1997), p. 159-160
[357] Hong, Seong Kuk (1999); Cho, Myung Cheol (1996),p. 42-43
[358] Kim, Yeon Cheol (1997)
[359] Chun, Hong Tack (1997b)
[360] Hwang, Dong Un (1998)

that the recent food crisis has already triggered and will reinforce market reforms in the DPRK. But were the increasing private food production and trade really fundamental changes in the DPRK agriculture? Or will they be really followed by wider-scale market reforms such as the dissolution of cooperative farming into private farming?

Consider the private plot of PDS population. Of the four changes above, it was the only change that was institutionalised during the food crisis. Interestingly however it is nothing new in the DPRK history that PDS population have and cultivate private plots. In chapter 4 we have seen that during the Korean War the government officially allocated cultivating lands among state institutions that were receiving state food rations, encouraging them to privately grow grains in compensation for the reduction of the rations.[361] This practice continued until food production recovered the pre-war level in the mid 1950s. Hence it was hardly surprising that the government allowed the private plots of PDS population in the 1980s/90s when the country faced the worst food shortage in history, even worse than during the Korean War. By the same token, it would not be surprising either even if the government re-collect the plots from PDS population as the country's food situation improves and thus the government regains its capability to supply appropriate food rations to the population. It raises a possibility that the private plots of PDS population might be neither fundamental nor permanent change that will trigger another market reforms in agriculture.

Apart from the private plots of PDS population, all the other changes above have not been institutionalised until this time. It means that, although private production and trade have been effectively tolerated, they remain still illegal: hence the government could always punish them. Indeed the government tightened its regulation on private food production and trade almost periodically even during the food crisis. Let us look at farmers' markets. As the influences of farmers' markets increased after they had been transformed into daily markets in 1982, the government changed them into weekly markets (or 10-days markets) again between 1987 and 1989 and forcefully closed some markets in cities.[362] Between 1989 and 1992 trading illegal items such as grains and industrial products was actually punished.[363] And in

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[361] see section 4.3.2.3 in chapter 4
[362] Cho, Myung Chéol (1996), p. 45
[363] Chun, Hong Tack (1997b)

January 1999 Kim Jong Il ordered the government to reinforce state control over farmers' markets and prevent labour force from moving from regular workplaces to farmers' markets.[364] In particular, private grain trade was banned from farmers' markets again in July 2002; since then the market operations have significantly shrank.[365]

The situation was similar in illegal private plots, *teogi-bat*, as well. In 1989, two years after *teogi-bat* reportedly first appeared, the government announced to punish any individuals to have and cultivate *teogi-bat*. And in 1992 so-called 'non-socialist activities breaking-up groups' were organised to take actual actions. In particular, the government actually confiscated individual households' *teogi-bat* and redistributed it among state firms in May 2002.[366]

Of course, those counter changes against private food production and trade do not mean that market reform is impossible in the DPRK. If the food crisis lasts for a long period to come, private food production and trade may not disappear and another market-oriented policies may be implemented, regardless of the government's true attitudes toward agricultural market. Nevertheless, what available evidence has suggested so far is that it is at least not the intention of the government to permanently allow increasing private food production and trade. In this sense it seems too early to make any robust conclusion about the meanings and implications of increasing private food production and trade during the food crisis concerning the future of the DPRK agriculture.

9.3. State Food Rationing: Collapse or Revival?

The corollary of increasing private food production and trade was the weakening of state food rationing system.

It is unmistakable that the DPRK food rationing system failed to provide appropriate food supply to the population during the food crisis. As shown by tale 9-3, state food rations persistently fell since 1987 and particularly it declined below the

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[364] the ROK Ministry of Unification (8 Oct 1999)
[365] Chosun Daily News (27 August 2002)
[366] Chosun Daily News (9 June 2002)

minimal food requirement for human survival set by UN, 457 grams per day or 167 kg per year, between 1995 and 1999. Moreover, state food rations stopped being provided for several months in 1996-98 and consequently PDS population had to entirely rely on international food aid or other non-official food sources. Due to this failure the government changed the existing food rationing system in several aspects during the food crisis. The changes mainly intended to reduce the rationing burden of the central government by decentralising the powers and responsibilities of providing food rations from central bureaucrats to local administrators and state firms.

Table 9-3. The Changes of Food Rations during the Food Crisis

	Daily Ration	Duration for no ration supply
1987-1992	547 grams	-
1992-1994	492 grams	-
1994-1995	n.a	n.a
Nov.95-Oct.96	299 grams	-
Nov.96-Oct.97	187 grams	4 months
Nov.97-Oct.98	252 grams	5 months
Nov.98-Sept.99	334 grams	n.a

* The daily rations between 1987 and 1994 are rationing norms while those between November 1995 and September 1999 are actual rations.

** The daily rations between November 1995 and September 1999 are simple averages of PDS rations and farm household rations.

Source: 1) For Daily Ration, table 6-1 in chapter 6 and table 8-14 in chapter 8
2) For duration for no ration supply, annex table 8-3 in chapter 8

First, as mentioned above, state firms have got formally responsible for providing cultivating land for their employees and thus effectively sharing the burden of state food rations to PDS population since 1987.

Second, the government announced the years of 1995-97 as the period of so-called 'arduous march' during which each province, city and county should be in principle self-sufficient on food without central support.[367] During this period province and county administrators were reportedly empowered to conduct food trade independently with other provinces, counties and even neighbouring countries; and, when the trade was successful, the regions were excluded from central food support.[368]

Third, the government experimentally abolished state food rationing in some regions in 1997.[369] According to the DPRK defectors, there was a drastic price reform in the Rajin-Sunbong special economic zone in that year. All the state (rationing) prices of grains were abolished and the supply of state food rations was completely stopped. Instead, the government raised the salaries of ordinary workers up to 3,000-4,000 won by around 3-40 times. Since then the residents in the Rajin-Sunbong zone have reportedly bought all their foodgrains from farmers' markets, say, at the market price of around 60 won per kg for rice.

Fourth, it was officially announced that there was a nation-wide price reform in July 2002 in which the government drastically increased both the rationing prices of grains and the salaries of industrial workers.[370] For instance, the state price of rice rose from 0.08 won per kg up to 44 won by more than five hundred times. And the price of maize went up from 0.49 won per kg to 20 won by around twenty times. To help PDS population purchase their rations at new state prices, the government also increased the standard salary of an ordinary office worker from 150 won per month to 2,000 won by around seven times. But this increase in the salary was far short of the increase in state food prices. Moreover, because this price reform was quite similar to that leading to the abolishment of state food rationing in the Rajin-Sunbong special economic zone in 1997, it was widely regarded as an important signal that the government would eventually abolish the country's long-lasting food rationing.

From the above changes it seems clear that the DPRK food rationing system significantly weakened during the food crisis. But the question is whether this

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[367] Kim, Byung Ro (1998) p.141-149
[368] Natsios (1999); Lautze (1996)
[369] Chosun Daily News (19 July 2002)

weakening is temporal or permanent. In other words, whether will the rationing system survive or be eventually abolished?

On the one hand, there are many reasons to believe that the DPRK government might be actually considering to abolish the rationing system. Perhaps the most compelling reason is the path of the changes in the rationing system: the ongoing reductions of state food rations ⇒ the stress of food-self sufficiency at state firm (or household) level ⇒ the decentralisation of the rationing system ⇒ the experimental price reform and corresponding abolishment of food rationing in some regions ⇒ a similar price reform at national level. On the other hand, however, there are also many other reasons to believe that the government will reinforce food rationing as soon as the country's food situation improves.

Consider the private plots of PDS population and the decentralisation of the food rationing system. As pointed out already, it is nothing new in the 1980s and 90s that PDS population was allowed to have and cultivate private plots. In addition, we have seen in chapter 3 and 4 that the rationing system has operated basically at provincial levels with locally available food sources from its very beginning in the 1950s. This means that both changes can not be the good evidence to show that the rationing system fundamentally changed during the food crisis.[371]

One might emphasise that food rationing was already abolished in the Rajin-Sunbong special economic zone. But its implication seems very limited. The special economic zone is a completely separate area not only socially and economically but also physically. It aims to encourage foreign investments, particularly western investments, and so constitutes the only area in the DPRK that is supposed to be run by market mechanism. And it is strictly prohibited for the DPRK citizens to travel in and out of the zone without official permission. [Indeed there are iron fences surrounding the zone to prevent such travels]. It is therefore doubtful how important

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[370] Chosun Shinbo [People's Korea] (17 August 2002)

[371] It is of course an important change that provinces and even counties were empowered to conduct international food trade independently for the first time. Note however that this policy has mainly aimed at the northern provinces of the country bordering China. During the food crisis those provinces suffered the most severe food shortages due to both mountainous geography and high industrial population shares. However both factors also meant that they had relatively various non-food tradable resources. Hence it might be unavoidable that the central government allowed the provinces to import food from China independently when it reduced or even shut down domestic food shipments to the provinces. However, because these provinces are the most industrialised regions in the country, it

the abolishment of food rationing in this area was in terms of the institutional changes of the existing rationing system.

That the abolishment of food rationing in the Rajin-Sunbong zone had little influences is well confirmed by the fact that the nation-wide price reform of July 2002 was actually intended to strengthen the existing rationing system. In contrast to the outside expectation that the country will abolish the rationing system soon after the price reform, the government recently made it clear that state food rationing will continue.[372] Moreover, it has become evident that the primary purpose of the price reform was to regain state control over grain circulation in the economy that was necessary for the operation of the existing rationing system. Until the price reform was implemented, there had been great differences between the state procurement prices and market prices of grains. According to the DPRK defectors, for instance, the market price of rice had been around 40-60 won in 2002 while its state procurement price had been only 0.8 won. Undoubtedly these price differences had driven grain producers to sell more grains to farmers' markets, making state grain collection quite difficult during the food crisis. The July 2002 price reform was to resolve this difficulty by increasing the state procurement prices up to the market levels and at the same time to ensure PDS population to buy state food rations by increasing their salaries accordingly. Indeed, shortly after the price reform was implemented, the government banned private grain trade in farmers' markets, showing what was the real purpose of the price reform.

From the above discussions we can make two conclusions. First, during the food crisis the government took several measures to reduce the rationing burden of the central government, which resulted in the weakening of the existing food rationing system. Second, however, it is still not clear whether such measures are permanent, eventually leading to the abolition of food rationing, or only temporary, mitigating the crisis and so eventually fading away as the crisis ends.

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would not be surprising if the central government prohibit such independent food trade when the country's food production improves and so domestic food shipments to these provinces recover.

[372] Chosun Daily News (31 July 2002)

9.4. The End of State Grain Marketing?

Another important change in agriculture during the food crisis was that in principle the government gave up collecting all surplus grains from producers (cooperative farms). In the late 1950s, as discussed in chapter 4, the country established state grain marketing system in which the government protected farm households' food rations in cooperative farms but instead procured all their surplus grains.[373] In 1996, however, this system was fundamentally changed as a new sub-team contract system was introduced.

Table 9-4. The New Sub-team Contract System

	Sub-team Contract System	New Sub-team Contract System
Member of Sub-team	10-25. Each sub-team consists of old, senior and junior members to consider members' capabilities by ages	7-10. Each sub-team consists of family members or relatives.
Production Targets	determined by annual state production targets	[last 3 years' average harvest + the 10 years' average harvest before 1993] / 2
Disposal of Surplus	Surplus products exceeding production targets should be sold to state procurement agencies	Surplus products exceeding production targets should be directly distributed in kind to each sub-team

Source) Kim, Yeon Cheol (1997)

In comparison with the old sub-team contract system, the new system has several interesting features. For instance, the number of members in one sub-team have been reduced to 7-10 from 10-25 persons, making it possible that one sub-team consists of only family members and relatives. In addition, the production targets imposed on sub-teams have been effectively fixed at the previous years' production, that is, the average of the last 3 years' average harvest and the 10 years' average harvest before 1993.

[373] see section 4.3.2.1 and 4.3.2.2 in chapter 4

Given that the targets in the old system had been determined year by year according to the country's needs, usually far exceeding actual production, the new system seems to impose more realistic targets. Needless to say, the purpose of this new system is to motivate farm households to increase the country's grain production.

Of the various features of the new system, however, the most distinctive is that now sub-teams (or their members) have the rights to keep their products, particularly grains, exceeding the production targets. In the old system, sub-teams (or their members) could keep only the amounts of grains for their food rations, regardless of their production. When they over-fulfilled their production targets, they received more money from the cooperative farm. But the farm still collected all their products exceeding their food rations and sold them to state procurement agencies. By contrast, when they under-fulfilled their production targets, they should pay the differences between the targets and actual production to the cooperative farm by money. Nevertheless, they still secured the amounts of grains for their food rations. Therefore, although their money income varied according to their production, they could have neither more nor less products in their hands than their food rations. But the new system allows sub-teams to keep all their products exceeding the production targets. In principle, therefore, farm households now have a part of surplus products in their hands; and particularly the ratio of the surplus kept by farm households in total production should rise up when the production increases year by year.

It means that the government is not the only economic agent being able to provide surplus grains to the economy any more. Moreover, if the government institutionalises private grain trade in farmers' markets, it would not be the sole grain trader in the economy either. In other words, due to the introduction of the new sub-team contract system the existing state grain marketing system has in principle collapsed.

Interestingly, however, there are still many reasons to believe that despite the new sub-team contract system the government has not actually intended to leave any significant amount of surplus grains in the hands of farm households. First of all, where the new system has been put in place, the government has stopped protecting farm households' food rations.[374] That is, when a sub-team under-fulfils production

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[374] Kwon, Tae Jean (1999)

target, now it has to pay the difference between the target and actual production to the cooperative farms by grains, not by money. Because the target is largely determined by the average harvest before 1993, and because the country's agricultural infrastructure has dramatically collapsed since, most sub-teams are likely to under-fulfil their targets rather than to over-fulfil them. It means that the new system is likely to procure more grains from farm households rather than to leave them more surpluses. Second, the DPRK related media has announced that most sub-teams over-fulfilling the production targets have used the surplus grains left in their hands to buy more agricultural inputs such as fertilisers exclusively supplied by the government.[375] It suggests that many farm households might have been forced to sell their surplus grains to the government, in contrast to the official claim that they could dispose them at their free will, including selling them in farmers' markets. Third, it is not clear how widely the new system has been applied. Indeed many DPRK defectors who had been engaged in farming activities were unaware of the new system until they defected.

To sum, although the government allowed in principle farm households to keep a part of their surplus products during the food crisis, it is too early to conclude whether this policy will really lead to the collapse of state grain marketing system in which the government collect all surplus grains from producers.

9.5. Agricultural Planning: Deregulation or Regulation?

Finally we consider how the food crisis has influenced the ways the government has controlled farm operations. As discussed in chapter 2, agricultural production in the DPRK has been organised in highly centralised and administrative manners. The central government has imposed quantitative output targets and corresponding resource allocation plans up to cooperative farms through centralised administrative hierarchy; and local administrative organisations (PREC and CCMC) have directly controlled all farm operations from the selection of crop items to the choice of

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[375] Chosun Shinbo [People's Korea] (30 July 1997), which is electronically available from http://www.korea-np.co.jp/pk/157th_issue/002nd_issue/97073004.htm

technologies involved. During the food crisis, however, the government liberalised farm operations in several aspects.

First, many cooperative farms were reportedly given back their rights of crop selection.[376] Since 1997 the DPRK government has diversified the country's crop composition which had mainly consisted of rice and maize. In intermediate and mountainous areas, potatoes have been emphasised as the main crop items to replace maize; and in some mountainous areas, beans and other minor grains have been also encouraged to grow. And the government has emphasised that cooperative farms should determine what they grow and thus initiate this crop diversification.[377] Indeed FAO/WFP mission teams have found that many cooperative farms have now actually exercised their rights of crop selection. In particular, those cooperative farms in the Rajin-Sunbong special economic zone have reportedly had little intervention by the local authorities concerning their crop selection.[378]

Secondly, cooperative farms have been officially given the rights to own farm machinery such as tractors. As discussed in chapter 4, one of official reasons why the government controls the operations of cooperative farms has been that it has exclusively owned and supplied all agricultural inputs. Of those inputs, farm machinery has been particularly important in the sense that all agricultural production procedures have been organised around the machinery, thus being directly influenced by the machinery supply of the local authorities. But the New Socialist Constitution of August 1998 stipulates:

> Article 22. The property of social cooperatives refers to the collective property of working peoples within the cooperatives concerned. Social cooperatives can possess such property as land, agricultural machinery, ships, medium and small sized factories and enterprises.....[379]

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[376] Kim, Woon Keun and Jeon, Hyung Jin (1999b), p. 7-9

[377] For instance, Han Deok, the vice-Minister of agriculture, said through Pyongyang media that "the agricultural reform should focus on farmers' needs and willingness to choose and cultivate high-yield agricultural items", emphasising that the government allowed farm households to choose their crops by themselves (Kim, Woon Keun and Jeon, Hyung Jin, 1999b: p.8)

[378] Ryu, Tae Young (1998)

[379] The DPRK Constitution of 5 September 1988 (http://www.unikorea.go.kr/kr/unipds/unipds_n_law.php?cur_page=2& pdm=&pmd=view&num=1). In particular, the new constitution deletes 'draft animals' from the objects of the property of social cooperatives, suggesting that now individuals can own draft animals (Jang Myung Bong: 1998). Given that under the new sub-team contract system those farm households with blood-ties can carry out agricultural production separately and keep their products after meeting state production quotas, this individual ownership of draft animals undoubtedly intensifies the influences of individual members within cooperative farms. Moreover, the new

It means that now agricultural production could in principle proceed within cooperative farms with relatively little influences of the local authorities.

Thirdly, the government allowed cooperative farms to introduce their own incentive systems to increase production. In 1999, for example, FAO/WFP mission teams found that the members of cooperative farms were newly allowed to elect their farm chairmen from those who offer more production merits.[380]

It seems straightforward that the basic reason why the government liberalised farm operation during the food crisis was to increase agricultural productivity. Perhaps the liberalisation was the only option to boost farm outputs given that the government lost its capability to provide appropriate state resources to agriculture. An interesting point is however that, in contrast to this liberalisation at farm level, the government intensified central control within agricultural administrative organisations.

In September 1998, for instance, the DPRK Supreme People's Assembly (SPA) carried out an administrative reform, replacing Agricultural Commission with Ministry of Agriculture and thus reviving ministerial hierarchy in agriculture that had disappeared in 1961.[381] There was no change in local agricultural administrative organisations (PREC and CCMC). A distinctive feature of the reform is that now the central ministry in agriculture has an official purpose to oversee detailed agricultural planning. Indeed, due to the reform the Department of Agricultural Planning has appeared as one of the most important departments in the Ministry of Agriculture with more than 30 professional planning staff in Pyongyang and 10-12 staff in each province.[382] It is true that Agricultural Commission also had had a planning

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constitution allows even cooperative farms to engage in foreign trade by stipulating that not only the state but also social cooperatives can conduct the trade.

> Article 36. In the DPRK the state and social cooperatives shall conduct foreign trade activities. The state shall develop foreign trade on the principles of complete equality and mutual benefit (The DPRK Constitution of 5 September 1998).

Although it is questionable whether the farms can actually carry out foreign trade without state intervention, it also reflects that the authorities have gradually liberalised farm operations.

[380] FAO/WFP (8 Nov. 1999)

[381] see "Agricultural Sector Institutions in the DPRK", Chosun Shinbo [people's Korea] (18 Feb 1999) available from http://www.korea-np.co.jp/pk/082nd_issue/99021802.htm

[382] see "Agricultural Sector Institutions in the DPRK (II)", Chosun Shinbo [people's Korea] (24 Feb 1999) available from http://www.korea-np.co.jp/pk/083rd_issue/99022405.htm

department and particularly it established Staff department in 1979, overseeing both agricultural planning and resource allocation. Nonetheless, it had nominally still no planning-related-powers, as discussed in chapter 4, which had not changed until it was replaced by Ministry of Agriculture. In this respect the 1998 administrative reform suggests that at least the DPRK government has no intention to decentralise agricultural administrative organisations.

What is interesting is the timing of the administrative reform. As seen in previous sections, the DPRK government made a series of liberalisation and decentralisation policies in agriculture between 1987 and 1996; and consequently private food production and trade flourished while state food rationing and grain collection weakened significantly. Hence there were many speculations that the country would eventually give up or at least play down its socialist planning in agriculture. But the 1998 administrative reform suggests that the government has not intended to change the existing socialist planning in agriculture but, on the contrary, to reinforce it. Indeed, shortly after the administration reform was completed, the authorities announced 'People's Economic Planning Law' in 1999, making it clear that the country will not make any change in its socialist economic planning.

> The adoption of Peoples' Economic Planning Law is a huge blow to all wicked attempts to destroy the socialist economy in our country. History shows that socialism will collapse when socialist planned economy is abandoned. When imperialists are trying all attempts to destroy our socialist economy..... the adoption of Peoples' Economic Planning Law is the announcement of our people's faith and willingness to follow the socialist way to the end as well as the serious warning to the attempts to destroy the socialist economy.[383]

More interesting is the fact that the central government has launched another *Juche Nongbub* campaign since 1998. Between late 1998 and early 1999 Kim Jong Il highlighted the importance of *Juche Nongbub* in agriculture, on the one hand, but at the same time emphasised that some technical aspects of *Juche Nongbub* should be changed according to the situation, presenting several new agricultural policies that had great differences with the existing ones. They include: 1) potato production

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[383] Kim, Jin Kuk "The Implications of People's Economic Planning Law", Rodong Shinmun [Workers' Daily] (27 April 1999), quoted by *Bukhan Nongup Donghyang [North Korean Agricultural Trend]* Vol.1. No 2. 1999, P.36

(instead of maize production); 2) seed revolution; 3) double cropping (instead of mono-cropping of maize); 4) organic fertiliser (instead of chemical fertiliser); 5) land rehabilitation; 6) making grass lands for animal rearing (instead of increasing sown area); 7) expanding rice production in flat areas etc.[384] Since then its has been the most important task of all state agricultural agencies to implement this new version of *Juche Nongbub*, that is, Kim Jong Il's new agricultural policies.

An interesting point is that the new *Juche Nongbub* campaign has proceeded in a quite similar way to the old one in 1973-78. Let us take an example of potato production. New *Juche Nongbub* encourages potato production, instead of maize, for various reasons. While maize is a high-fertiliser-consuming-crop, it does not require much fertiliser; it is harvested before rice and maize, helping people survive lean season; it is also suitable for double cropping with other minor grains. In these reasons Kim Jong Il visited Daehongdan county, Ryanggang province, the greatest potato production area in the country, in October 1998, praising the county's performance and ordering the government to spread its experiences to the whole country.[385] Due to his order Potato Research Centre, which was newly established in Agricultural Science Academy in May 1998, has been given the task to develop new high-yield potato varieties and establish standard production processes. And the Ministry of Agriculture has been responsible for spreading the varieties and processes to cooperative farms across the country. It means that the central government has standardised farming practices concerning potato production and imposed them on local governments and cooperative farms. Of course, as quoted above, the government has claimed that it is up to cooperative farms whether and how they carry out potato production. Note however that, as discussed in chapter 5, the same procedures for maize in 1973-78 resulted in the establishment of the highly centralised current agriculture where the central government controls all planning and farming activities of both local government and cooperative farms. In this reason, we believe, the new *Juche Nongbub* campaign may play the decisive role for the central government to regain its control power in agriculture that had been shattered by the food crisis.

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[384] Rodong Shinmun [Workers' Daily], the official newspaper of the Korean Workers' Party, published 11 articles about the new agricultural policy under the title of "The Explanation of the Agricultural Policies Presented by Dear General" between 13 May 1999 and 13 June 1999. The seven agricultural policies mentioned in the text are based on these newspaper articles.
[385] *Bukhan Nongup Donghyang [North Korean Agricultural Trend]* Vol.1. No 1. 1999, P.44

The above discussion can be summarised as follows. First, during the food crisis the government liberalised farm operation in several aspects in order to boost agricultural production. Second, however, the government made it clear that it will not change the existing socialist planning in agriculture. Moreover, it intensified central control within agricultural administrative organisations. Third, therefore, it is difficult to make a robust conclusion concerning whether the food crisis really changed the way and degree of state control over agriculture.

9.6. Conclusion

So far we have seen that the recent food crisis brought many important changes to the existing agricultural institutions in the DPRK. But we have also seen that there were many counter-changes to reinforce the existing institutions: hence it is difficult to judge whether the changes (and the counter-changes) will last and whether new agricultural institutions such as markets will replace the existing institutions. In this respect it seems quite natural that there exist many different views about the future of the DPRK agriculture after the food crisis. We conclude this chapter by presenting two possible extreme views on the issue.

One extreme view focuses only on the changes of the existing institutions. According to this view, the food crisis has dismantled the institutions from the bottom. It has rapidly developed private food production and flourished market food trade outside the official economy in which all food production and distribution have been controlled by the government. Because the official economy has lost its capability to provide appropriate food supply, that is, because state food rationing system has collapsed, the population has faced a new situation where their food consumption has been increasingly dependent on market factors such as their private production, income and market prices. The food crisis has changed the ways the official economy has been organised, too. In order to increase food production in the official economy, the government has introduced more individual incentives and liberalised farm operations. In consequence, state intervention in agriculture has been weakened while individual farm households have increased their influences on farm operations. Needless to say, this view may see that the above changes are not

reversible and thus the existing socialist agricultural institutions in the DPRK will be eventually replaced by markets.

But another extreme view emphasises the counter-changes to reinforce the existing institutions. According to this view, although private food production and trade have increased, they are only temporal phenomena because the government has still illegalised such activities and punished them whenever the food situation improves. In particular, as private food production and trade flourished, the government stepped up its efforts to transfer private resources to state resources by taking such measures as confiscating illegal private plots and closing down grain markets. In this respect, when food production in official economy improves, it may be not so difficult to revive state rationing system and, at the same time, terminate private food production and trade. The same policy has been applied to the official economy as well. Although the government has liberalised farm operations, it has also reinforced the existing agricultural administrative organisations and intensified central control within the organisations. It suggests that the government is likely to recover the existing agricultural planning institutions in which the central government controls all farm operations through centralised administrative hierarchy, rather than further liberalise farm operation and reduce state intervention in agriculture. From this view, therefore, the impacts of the food crisis should be temporal: hence the existing agricultural institutions will eventually survive without significant changes.

It is of course extremely difficult, perhaps practically impossible at present, to judge which views are more realistic. Undoubtedly the issue largely depends on how long and severe the food crisis will last. For example, even when the government intends to recover the existing institutions, it would not be feasible if the country's food situation worsens for a long period to come. To judge both views, therefore, we must know how the food situation will be unfolded, how the changes and counter-changes of the existing agricultural institutions will affect the food situation, and how the government will react if the food situation improves or worsens. But there is little information available concerning those questions. It seems therefore too early to make any conclusions about the real impacts of the food crisis on the DPRK agricultural institutions.

X. Conclusion

In this thesis we have tried to understand the food crisis that hit the DPRK particularly badly in the mid/late 1990s. The motive of the study was that, although the food crisis has drawn many academic, humanitarian, economic and political concerns from international society, surprisingly little is known about it. And the primary questions of the study were the followings. First, when and why did the food crisis occur? Second, how severe was it? Third, was it different from food shortages or famines in other countries?

Our starting point was a simple fact that the country has experienced almost periodic food shortages, which has been interestingly accompanied by corresponding institutional changes in agriculture. As a preliminary but necessary step to proceed with the food crisis in the 1990s, therefore, we have studied first the relation between food shortages and agricultural institutions in the DPRK history. This study has produced two findings.

First, the institutional evolution of the DPRK agriculture was triggered and motivated by repeated food shortages. In 1945-46, shortly after its independence, the country faced a serious urban food shortage, which highlighted two fundamental issues in the economy: 1) how to establish secure food supply channels for newly established urban socialist sector; 2) how to increase the country's foodgrain production. To resolve the first issue two grain marketing institutions, agricultural tax-in-kind and the voluntary grain purchase by Consumer Association on behalf of the government, were established. And state food rationing commenced to protect the food consumption of socialist sector. Concerning the second issue the state monopolised agricultural resource supply and, on this basis, induced individual farm households to increase food production. After the Korean War agriculture was collectivised for the purpose of recovering production from war damages as quickly as possible. In 1954-55 however rural food crisis occurred, demonstrating that the country still suffered grain collection problem and low production. The crisis resulted in the new agricultural institutions based on collective farming. Now the state monopolised all grain marketing and, in return, expanded state food rations to the whole population, including farm households. To increase food production agriculture

was decentralised and localised planning institutions were put in place. But this decentralised agriculture did not prevent agricultural stagnation and corresponding food shortage in 1970-73. To overcome the shortage Juche Nongbub was introduced, and in terms of institutions it enabled the central government to directly control local administrators and farm households concerning agricultural planning and resource allocation. In consequence, agriculture was re-centralised.

Second, the current agricultural institutions in the DPRK have been organised so as to prevent unexpected food shortages. The underlying idea of the institutions is that the central government plans and controls all economic activities concerning food production, distribution, consumption and trade, maintaining national food balance. Agricultural production is carried out under the close supervision of centralised administrative organisations that impose quantitative output targets on producers and control all resource allocation in agriculture. Food distribution is made only by state agencies, and food consumption is controlled according to clearly defined national rationing norms. Food trade is conducted by only the central government.

With these two findings we have proceeded to the detailed study of the food crisis in the 1990s. Naturally the focus of the study has lied in the relation between the food crisis and the current agricultural institutions.

We began by establishing two basic facts about the food crisis. One is that the crisis actually started from 1987 but its contents fundamentally changed from 1994 when the country began to face famine situation. Another is that the country's agricultural policies to increase grain production, including the expansion of sown areas, the transformation of crop composition to high yield grain items, the maximisation of input supply, the introduction of dense planting and the establishment of farming practices to prevent the problems of dense planting, have all collapsed since 1987, which was the main reason for the food crisis. Then, we have identified three controversial issues surrounding the food crisis. First, did the food crisis escalate into famine? Second, if so, what were the main features of the famine? Third, has the food crisis changed the DPRK agriculture?

To study the first issue we have estimated the number of excess deaths in the 1990s using official population statistics. And this estimation has led us to several interesting conclusions. Above all, we have found that there was famine between 1994 and 1998(9). But it was not such a great famine as frequently reported by

international media. In 1994-99 total excess deaths numbered 688 thousands and, on annual average, the number of excess deaths comprised only 0.53 percent of total civilian population. Compared with other socialist famines such as the 1959-61 Chinese famine and the 1932-33 Soviet famine, therefore, the DPRK famine was a relatively mild one. In terms of duration, however, the famine was not mild at all because it lasted over 5 years while other socialist famines lasted 2-3 years at maximum. From regional perspectives, the famine tended to be severer in the northern and eastern parts of the country. At provincial level it was severest in North and South Hamgyung and relatively milder in North and South Hwanghae.

Concerning the second issue we have examined three aspects of the famine: its causation (category), victims and main impacts. The findings we have made concerning the DPRK agricultural institutions have been mainly utilised for this examination. And the conclusion is that the DPRK famine was unique in its every aspect, compared with other socialist famines. Above all, it was a rare national FAD1 famine in which there were no feasible policies to prevent the famine given the level of food availability decline. In addition, it was primarily an urban famine. Its impact was quite distinctive, too. Despite massive FAD the famine did not cause massive population loss in a short space of time. Rather, it resulted in the ongoing health risks of the whole population for a long period. In this sense it seems most appropriate that UN aid agencies described the famine as "famine in slow motion". Those distinctive features of the famine came from the very character of the current DPRK agricultural institutions. In the DPRK food rationing system, for instance, farm households have stronger entitlements than their counter parts in industry, which made the famine urban famine. In addition, as the famine hit mainly urban population that was vital for regime survival, the government was sensitive to the impacts of the famine. This sensitivity led to the establishment of national coping strategies initiated by the government, which efficiently prevented massive population loss during the famine period. As the result, during the famine period many victims got physically gradually weaken for a long period, rather than perished away for a short period of shock.

Unlike in the first and second issue, we have not drawn definite conclusions about the third issue. It is mainly due to the institutional confusions the DPRK government showed during the food crisis. Indeed, on the one hand, the government has encouraged private food production and trade, reduced the importance of state

food rationing, allowed farm households to keep surplus grains and deregulated farm operations since the 1980s. Undoubtedly it suggests that the food crisis has changed the DPRK agriculture. But the government has not institutionalised private food production and trade yet. Further, it has frequently punished them whenever food situation improves. It has also made several attempts to reinforce state control over grain circulation and intensify central control within agricultural administrative organisations. This means that the government might not have genuine intentions to change the existing institutions so that the above changes made during the food crisis might disappear as the food crisis ends. In this sense we have argued that it is too early to judge whether and how the food crisis has changed agriculture.

Like most other studies about the DPRK economy, this thesis has one thorny problem: it can not be completely free from the lack of data and the reliability concerns of available data. Although this thesis has mainly utilised official DPRK data, they are far short of the amount that modern economics normally requires in order to analyse economic phenomena. Hence we can not have used any econometric methods to test our conclusions. Furthermore, there are still great concerns about the reliability of official DPRK data. When someone ignores the official data due to this reliability problem and uses other data made outside the DPRK, he or she might reach quite different conclusions from those of this thesis. The conclusions of this thesis should therefore be interpreted under this limit. Nonetheless, what we have tried so far is to show that it is much more feasible to study the DPRK economy using official DPRK data as generally conceived. We believe that this approach is one way to flourish productive controversies among the DPRK students and so deepen our understandings about the country.

Appendix I.
Population Projection Results: 1994- 1999.8.31.

1. Estimation Results using the 1993 Census Death and Birth Rates

1-1. Estimated Population

A. Total

Age	1993	1994	1995	1996	1997	1998	1999.8.31
0	416088	455507	468132	477146	480370	476189	469557
1	430828	410250	449116	461563	470451	473630	471828
2	417751	428602	408129	446795	459178	468020	470271
3	411963	416148	426957	406564	445080	457416	463453
4	411878	411043	415219	426004	405656	444086	452386
5	375776	411368	410534	414704	425476	405153	430753
6	375229	375458	411020	410187	414354	425116	411604
7	375550	374953	375182	410718	409885	414049	421233
8	365661	375365	374769	374998	410515	409683	412463
9	374367	365516	375216	374620	374849	410352	409801
10	351889	374226	365379	375075	374479	374708	398342
11	362999	351774	374104	365259	374952	374357	374511
12	350896	362890	351669	373991	365149	374840	374446
13	354202	350802	362793	351574	373891	365052	371501
14	347126	354103	350704	362691	351476	373787	367899
15	323772	347011	353986	350588	362571	351360	366207
16	280258	323653	346884	353856	350459	362438	354970
17	278596	280135	323509	346730	353699	350303	358272
18	320888	278459	279996	323347	346556	353521	351262
19	324784	320732	278323	279857	323185	346382	351009
20	302547	324589	320540	278156	279687	322987	338419
21	393602	302348	324373	320326	277970	279498	308318
22	377700	393383	302182	324190	320145	277813	278823
23	390744	377452	393126	301987	323976	319934	291757
24	398396	390453	377172	392834	301765	323733	321046
25	429689	398108	390172	376900	392551	301549	316162
26	470910	429336	397787	389858	376597	392238	331690
27	388589	470539	429001	397482	389561	376311	386710
28	371421	388239	470116	428617	397135	389223	380404
29	358916	371070	387873	469672	428216	396772	391507
30	367584	358565	370708	387494	469213	427802	406892
31	335844	367246	358236	370369	387139	468783	441233
32	294910	335540	366915	357913	370035	386791	441097
33	313079	294590	335175	366516	357525	369634	380782
34	296512	312743	294274	334814	366122	357141	365194
35	351522	296184	312397	293949	334441	365716	359744
36	352542	351146	295870	312065	293636	334083	354898
37	222207	352205	350811	295589	311768	293356	320249

38	246715	221937	351778	350386	295232	311391	299140
39	213468	246404	221657	351335	349944	294862	305610
40	180550	213198	246093	221377	350891	349501	312846
41	145761	180287	212887	245734	221053	350378	349451
42	149183	145542	180018	212568	245365	220720	306687
43	257661	148822	145188	179581	212050	244768	228415
44	257632	257167	148538	144910	179238	211643	233392
45	257761	257106	256642	148236	144614	178873	200404
46	253712	257151	256497	256034	147886	144271	167033
47	254808	253024	256453	255802	255340	147487	145081
48	241643	254097	252319	255739	255089	254628	182948
49	235153	240926	253342	251570	254979	254331	254021
50	233965	234439	240195	252572	250806	254205	253704
51	271929	232962	233435	239168	251490	249733	252016
52	243088	270890	232071	232542	238254	250528	249342
53	233292	242065	269750	231093	231564	237253	245355
54	226528	232103	240834	268378	229916	230385	234131
55	258953	225238	230780	239462	266849	228605	228828
56	224520	257057	223559	229056	237676	264859	239469
57	210963	222635	254924	221674	227121	235672	253635
58	196354	209047	220612	252637	219650	225045	230655
59	172867	194391	206930	218376	250110	217415	220888
60	185541	170859	192067	204422	215727	247117	225286
61	161514	182651	168185	188987	201104	212224	232864
62	136018	158819	179578	165341	185702	197560	204815
63	142377	133514	155918	176271	162279	182164	189891
64	123144	139599	130869	152853	172777	159045	171986
65	118885	120445	136521	127942	149458	168910	159894
66	103963	116240	117735	133431	125004	146051	158677
67	99774	101240	113189	114612	129872	121623	135405
68	95786	97126	98543	110169	111524	126355	120807
69	87653	92745	94015	95375	106620	107895	117522
70	77504	84701	89614	90815	92117	102971	103668
71	77503	74432	81317	86025	87152	88389	95417
72	72434	74301	71358	77930	82435	83487	84290
73	61664	69287	71123	68306	74572	78875	79481
74	50428	58608	65893	67683	65004	70944	73647
75	46371	47612	55310	62225	63960	61429	65110
76	47283	43254	44388	51541	58022	59683	58184
77	35645	44283	40499	41542	48214	54310	55350
78	29303	33101	41153	37627	38573	44745	48538
79	28658	26789	30262	37651	34415	35261	39156
80	23003	26060	24375	27536	34280	31327	31787
81	22435	20505	23228	21742	24562	30601	28889
82	15258	20127	18358	20792	19480	22008	25775
83	12299	13507	17856	16265	18420	17269	18862
84	8337	10827	11896	15752	14334	16233	15503
85	6774	7154	9275	10198	13534	12299	13489
86	5307	5775	6090	7881	8673	11541	10877
87	3704	4567	4967	5230	6754	7440	9168
88	3100	3065	3785	4114	4327	5576	6032
89	1950	2575	2547	3153	3425	3595	4354
90	1339	1617	2135	2113	2617	2842	2950
91	957	1081	1307	1725	1707	2119	2264
92	866	764	856	1036	1367	1354	1609

93	650	684	606	676	819	1080	1100
94	288	550	579	515	572	693	837
95	308	214	406	428	384	422	505
96	228	249	173	328	346	310	334
97	127	179	194	135	255	269	249
98	95	89	126	136	95	179	195
99	60	76	71	100	108	75	125
100+	97	145	146	143	165	185	179
Total	20522351	20867643	21219363	21573970	21925590	22266817	22484810

B. Male

Age	1993	1994	1995	1996	1997	1998	1999.8.31
0	213149	233161	239633	244205	245914	243738	240257
1	220786	209937	229647	236022	240526	242209	241322
2	214576	219650	208857	228466	234807	239288	240477
3	211464	213757	218812	208060	227594	233911	236970
4	211979	210991	213279	218322	207594	227085	231331
5	193007	211700	210714	212999	218035	207322	220304
6	192598	192830	211506	210521	212804	217836	210709
7	192717	192429	192661	211321	210336	212617	215979
8	187220	192605	192317	192549	211198	210214	211736
9	192041	187128	192510	192223	192455	211095	210441
10	179774	191955	187044	192424	192137	192368	204778
11	186063	179708	191885	186976	192354	192066	192221
12	180004	185995	179642	191814	186907	192283	192095
13	181345	179951	185940	179589	191758	186852	190429
14	177578	181286	179892	185880	179531	191696	188426
15	165840	177502	181208	179816	185800	179454	187551
16	135916	165771	177428	181133	179741	185723	181494
17	124312	135842	165681	177332	181035	179643	183623
18	140549	124241	135764	165586	177230	180931	180003
19	142173	140463	124165	135681	165485	177122	179582
20	112805	142074	140365	124079	135587	165370	173112
21	160319	112720	141967	140260	123985	135485	155305
22	156829	160209	112643	141870	140163	123900	131550
23	163840	156705	160083	112554	141758	140053	129229
24	171686	163697	156568	159943	112456	141634	140503
25	204918	171552	163569	156446	159818	112368	131778
26	231737	204717	171384	163409	156293	159662	128093
27	190989	231514	204520	171219	163252	156143	158378
28	182409	190774	231254	204290	171027	163069	158336
29	177042	182190	190545	230977	204045	170822	165525
30	181888	176816	181958	190303	230682	203785	181689
31	167219	181672	176607	181742	190077	230408	212516
32	144533	167021	181457	176398	181527	189852	216671
33	153209	144324	166780	181195	176143	181265	186804
34	144268	152993	144121	166545	180940	175895	179300
35	173559	144059	152772	143913	166304	180679	177323
36	173750	173309	143852	152552	143706	166065	175629
37	109842	173513	173073	143656	152344	143510	158375
38	121100	109667	173237	172798	143428	152102	146222
39	104739	120891	109478	172939	172500	143181	148947
40	87811	104553	120677	109284	172632	172194	152687
41	71306	87631	104339	120430	109061	172279	171986
42	72103	71156	87447	104120	120177	108832	150823
43	125647	71838	70895	87126	103738	119736	112225
44	125442	125300	71640	70699	86885	103451	114078
45	125313	125071	124929	71428	70490	86628	97627
46	123151	124886	124645	124504	71185	70250	80961
47	123883	122658	124386	124146	124006	70900	70282
48	116910	123405	122185	123906	123667	123527	88247
49	113973	116389	122855	121640	123355	123116	123026
50	113472	113473	115879	122317	121107	122814	122605
51	131251	112761	112763	115153	121551	120349	121500

52	117130	130520	112134	112135	114512	120874	120058
53	112522	116396	129702	111430	111432	113794	117982
54	108615	111681	115526	128733	110598	110599	112141
55	119439	107696	110736	114548	127643	109662	109589
56	105909	118059	106452	109457	113225	126169	114264
57	98977	104575	116572	105111	108078	111799	120313
58	89199	97591	103110	114939	103639	106564	108983
59	73752	87800	96060	101493	113137	102013	103864
60	77678	72327	86104	94204	99533	110951	103520
61	65846	75766	70547	83985	91886	97083	104503
62	55728	64009	73652	68579	81641	89322	92668
63	55690	53990	62012	71355	66440	79095	84081
64	46822	53829	52186	59941	68971	64220	72423
65	43315	45089	51837	50254	57721	66418	63337
66	37071	41663	43369	49860	48338	55521	61105
67	34545	35426	39815	41445	47648	46194	50862
68	31790	33036	33879	38076	39635	45567	44539
69	28204	30063	31241	32039	36008	37482	41292
70	23653	26596	28349	29460	30212	33955	34864
71	23052	22114	24866	26505	27544	28246	30634
72	22173	21463	20589	23151	24678	25645	26113
73	19293	20617	19957	19145	21527	22946	23562
74	14804	17843	19068	18457	17706	19909	20794
75	12654	13558	16341	17462	16903	16215	17583
76	12234	11431	12247	14761	15774	15269	14890
77	9467	11103	10374	11115	13397	14316	13986
78	7509	8459	9921	9270	9932	11970	12538
79	7460	6610	7447	8734	8160	8743	10023
80	5747	6563	5815	6551	7683	7179	7522
81	4751	4911	5608	4969	5598	6566	6284
82	3709	4012	4147	4736	4197	4728	5342
83	3046	3157	3415	3530	4031	3572	3914
84	1752	2605	2700	2921	3019	3448	3165
85	1224	1440	2141	2219	2400	2481	2745
86	865	986	1160	1725	1788	1934	2003
87	652	700	798	939	1396	1447	1536
88	527	508	545	622	731	1087	1126
89	297	399	385	413	471	554	767
90	206	237	319	307	330	376	424
91	97	154	177	238	229	246	271
92	97	63	99	114	154	148	165
93	65	68	44	69	80	107	109
94	20	50	52	33	53	61	74
95	16	10	25	27	17	27	35
96	8	12	8	19	20	13	18
97	4	4	6	4	10	10	8
98	6	2	2	3	2	6	7
99	6	6	2	2	3	2	4
100+	3	8	7	5	3	4	4
Total	9677663	9851654	10029015	10207853	10385263	10557312	10667094

C. Female

Age	1993	1994	1995	1996	1997	1998	1999.8.31
0	202939	222346	228499	232941	234456	232451	229301
1	210042	200312	219468	225542	229926	231422	230506
2	203175	208952	199273	218329	224371	228732	229794
3	200499	202391	208145	198504	217487	223505	226483
4	199899	200052	201940	207681	198061	217002	221054
5	182769	199667	199820	201706	207441	197832	210449
6	182631	182628	199513	199666	201550	207281	200895
7	182833	182524	182521	199397	199549	201432	205254
8	178441	182760	182451	182448	199317	199470	200727
9	182326	178388	182706	182397	182394	199258	199359
10	172115	182271	178334	182651	182342	182339	193565
11	176936	172066	182219	178283	182599	182290	182290
12	170892	176895	172026	182177	178242	182556	182351
13	172857	170851	176853	171985	182133	178199	181071
14	169548	172817	170811	176812	171945	182091	179473
15	157932	169509	172777	170772	176771	171906	178656
16	144342	157882	169455	172723	170718	176715	173476
17	154284	144293	157828	169398	172664	170660	174648
18	180339	154218	144231	157761	169325	172590	171258
19	182611	180269	154158	144175	157700	169260	171427
20	189742	182515	180174	154077	144100	157617	165308
21	233283	189628	182405	180066	153985	144013	153013
22	220871	233174	189540	182320	179982	153913	147273
23	226904	220747	233043	189433	182218	179881	162528
24	226710	226756	220603	232891	189310	182099	180543
25	224771	226556	226602	220453	232733	189181	184383
26	239173	224619	226403	226449	220304	232576	203597
27	197600	239025	224480	226263	226309	220168	228332
28	189012	197465	238862	224327	226109	226154	222067
29	181874	188880	197327	238695	224170	225951	225982
30	185696	181749	188750	197192	238531	224016	225203
31	168625	185574	181630	188626	197062	238375	228717
32	150377	168519	185457	181516	188508	196938	224426
33	159870	150266	168395	185321	181382	188369	193978
34	152244	159750	150153	168268	185182	181246	185894
35	177963	152125	159625	150036	168137	185037	182421
36	178792	177837	152017	159512	149930	168018	179270
37	112365	178692	177738	151932	159423	149846	161874
38	125615	112270	178541	177588	151804	159289	152917
39	108729	125513	112179	178396	177443	151681	156662
40	92739	108645	125416	112092	178259	177306	160159
41	74455	92656	108548	125304	111992	178099	177464
42	77080	74386	92570	108447	125188	111888	155864
43	132014	76984	74294	92455	108313	125032	116189
44	132190	131867	76898	74211	92352	108192	119314
45	132448	132035	131713	76808	74124	92244	102777
46	130561	132264	131852	131530	76702	74021	86072
47	130925	130366	132067	131655	131334	76587	74800
48	124733	130692	130135	131832	131421	131101	94702
49	121180	124536	130486	129929	131625	131214	130995
50	120493	120965	124316	130255	129699	131391	131100
51	140678	120201	120672	124014	129939	129385	130516

52	125958	140370	119937	120407	123742	129654	129283
53	120770	125670	140048	119663	120132	123459	127373
54	117913	120422	125308	139645	119318	119786	121990
55	139514	117542	120043	124913	139206	118943	119239
56	118611	138998	117107	119599	124451	138691	125205
57	111986	118060	138352	116563	119043	123873	133322
58	107155	111457	117501	137698	116012	118480	121672
59	99115	106591	110870	116883	136973	115401	117024
60	107863	98531	105963	110217	116195	136166	121766
61	95668	106885	97638	105003	109218	115141	128362
62	80290	94810	105926	96762	104061	108238	112146
63	86687	79524	93906	104916	95839	103068	105810
64	76322	85770	78683	92912	103806	94825	99563
65	75570	75356	84685	77687	91737	102493	96556
66	66892	74576	74365	83571	76666	90530	97572
67	65229	65814	73374	73167	82224	75430	84543
68	63996	64090	64665	72093	71889	80788	76268
69	59449	62682	62774	63337	70612	70413	76231
70	53851	58105	61265	61355	61905	69016	68803
71	54451	52318	56451	59520	59608	60142	64783
72	50261	52838	50768	54779	57758	57843	58177
73	42371	48670	51166	49161	53045	55929	55920
74	35624	40765	46826	49227	47298	51035	52853
75	33717	34054	38969	44762	47058	45214	47527
76	35049	31823	32141	36780	42248	44414	43294
77	26178	33179	30125	30427	34818	39994	41364
78	21794	24642	31232	28357	28641	32775	36000
79	21198	20178	22815	28917	26255	26518	29133
80	17256	19497	18560	20985	26597	24149	24266
81	17684	15594	17620	16772	18964	24036	22605
82	11549	16115	14210	16056	15284	17281	20433
83	9253	10350	14442	12735	14389	13697	14948
84	6585	8221	9196	12832	11315	12785	12339
85	5550	5714	7134	7979	11134	9818	10744
86	4442	4789	4930	6156	6885	9607	8874
87	3052	3867	4169	4292	5358	5993	7631
88	2573	2557	3239	3492	3595	4489	4906
89	1653	2176	2163	2740	2954	3041	3586
90	1133	1380	1817	1806	2287	2466	2527
91	860	928	1130	1487	1478	1873	1993
92	769	702	757	922	1214	1206	1444
93	585	617	563	607	739	973	991
94	268	500	527	481	519	632	763
95	292	204	381	402	366	395	469
96	220	237	166	309	326	297	316
97	123	175	188	131	245	259	240
98	89	87	124	133	93	173	188
99	54	70	68	97	105	73	120
100+	94	137	139	139	161	181	176
Total	10844688	11015989	11190348	11366118	11540327	11709505	11817717

1-2. The 1993 Age Specific Death Rates

A. Total

Age	Death Rate	Survival Ratio
0	0.0140328	0.985967157
1	0.0051678	0.994832196
2	0.0038368	0.996163201
3	0.0022331	0.997766933
4	0.0012391	0.998760879
5	0.0008455	0.999154467
6	0.000735	0.99926499
7	0.0004924	0.999507632
8	0.0003964	0.999603615
9	0.0003765	0.999623506
10	0.0003267	0.999673299
11	0.0003002	0.999699814
12	0.0002678	0.999732186
13	0.0002794	0.999720577
14	0.0003312	0.999668818
15	0.0003674	0.999632592
16	0.0004387	0.999561311
17	0.0004915	0.99950849
18	0.0004859	0.999514085
19	0.0006	0.999399961
20	0.0006573	0.999342683
21	0.0005561	0.99944391
22	0.0006562	0.999343825
23	0.0007442	0.999255821
24	0.0007224	0.999277623
25	0.0008209	0.99917915
26	0.0007872	0.999212784
27	0.0008999	0.999100116
28	0.0009441	0.999055873
29	0.000977	0.999023011
30	0.0009187	0.999081327
31	0.0009044	0.999095636
32	0.0010839	0.998916099
33	0.0010721	0.998927939
34	0.001105	0.998895028
35	0.0010685	0.998931509
36	0.000955	0.999044998
37	0.0012136	0.998786391
38	0.001259	0.998741023
39	0.0012632	0.998736771
40	0.0014545	0.998545459
41	0.0015002	0.998499794
42	0.0024207	0.997579324
43	0.0019174	0.998082555
44	0.0020414	0.997958622
45	0.0023687	0.997631331
46	0.0027122	0.997287757
47	0.0027904	0.997209623
48	0.0029708	0.99702925
49	0.0030398	0.99696019

50	0.0042899	0.995710145
51	0.0038246	0.996175446
52	0.0042111	0.995788887
53	0.0051005	0.994899526
54	0.0057017	0.994298305
55	0.0073371	0.992662928
56	0.0084134	0.991586618
57	0.0091028	0.990897178
58	0.0100231	0.989976909
59	0.0116633	0.988336659
60	0.0156349	0.984365052
61	0.0167773	0.983222743
62	0.0185229	0.981477072
63	0.019638	0.980362049
64	0.0220613	0.977938724
65	0.0223997	0.977600342
66	0.0263813	0.973618655
67	0.0266996	0.973300426
68	0.0320149	0.967985124
69	0.0339458	0.966054247
70	0.0399366	0.960063423
71	0.0416584	0.958341577
72	0.0437756	0.956224422
73	0.049876	0.950124035
74	0.0562033	0.943796672
75	0.0675822	0.932417759
76	0.0637771	0.936222873
77	0.0718656	0.928134358
78	0.0862515	0.91374848
79	0.0910014	0.908998636
80	0.1091015	0.890898528
81	0.1037472	0.896252796
82	0.1152218	0.884778197
83	0.1199284	0.880071556
84	0.1423722	0.857627816
85	0.1480317	0.851968306
86	0.1401491	0.85985094
87	0.1732143	0.826785714
88	0.1706795	0.829320492
89	0.1709184	0.829081633
90	0.1933735	0.806626506
91	0.2051495	0.794850498
92	0.2112933	0.78870674
93	0.1547464	0.845253576
94	0.2634271	0.73657289
95	0.191601	0.80839895
96	0.221843	0.778156997
97	0.2983425	0.701657459
98	0.2016807	0.798319328
99	0.2105263	0.789473684
100+	0.404908	0.595092025

B. Male

Age	Death Rate	Survival Ratio
0	0.0150686	0.98493138
1	0.0051458	0.994854187
2	0.0038162	0.996183809
3	0.0022365	0.997763497
4	0.0013144	0.998685562
5	0.0009162	0.999083775
6	0.0008767	0.999123294
7	0.0005808	0.999419175
8	0.0004912	0.999508841
9	0.0004476	0.999552379
10	0.000367	0.999633007
11	0.0003653	0.999634666
12	0.0002944	0.999705649
13	0.0003252	0.999674759
14	0.0004278	0.999572202
15	0.0004159	0.999584109
16	0.0005442	0.999455842
17	0.0005708	0.999429182
18	0.0006115	0.999388488
19	0.0006959	0.99930415
20	0.0007529	0.999247055
21	0.0006857	0.999314338
22	0.00079	0.999209955
23	0.000872	0.999127958
24	0.0007799	0.999220114
25	0.0009799	0.999020081
26	0.0009614	0.999038627
27	0.0011245	0.998875547
28	0.0011992	0.998800841
29	0.0012749	0.998725094
30	0.0011861	0.998813865
31	0.0011827	0.998817324
32	0.0014439	0.998556051
33	0.0014079	0.998592146
34	0.0014466	0.998553403
35	0.0014384	0.99856164
36	0.0013622	0.998637829
37	0.0015907	0.998409337
38	0.0017229	0.998277127
39	0.0017727	0.998227305
40	0.0020457	0.997954336
41	0.0020992	0.997900806
42	0.0036756	0.996324393
43	0.002762	0.997237986
44	0.0029567	0.997043254
45	0.0034038	0.996596178
46	0.0040034	0.995996636
47	0.0038597	0.996140331
48	0.0044536	0.995546397
49	0.0043852	0.995614763
50	0.0062617	0.993738341
51	0.0055688	0.994431228

52	0.0062697	0.993730328
53	0.0074712	0.992528822
54	0.0084625	0.991537492
55	0.0115529	0.988447056
56	0.0125956	0.987404438
57	0.0140064	0.985993644
58	0.0156809	0.984319135
59	0.0193205	0.980679476
60	0.0246114	0.975388634
61	0.0279024	0.972097555
62	0.0311881	0.968811933
63	0.0334114	0.966588562
64	0.0370203	0.962979721
65	0.0381284	0.961871558
66	0.0443648	0.955635183
67	0.0436841	0.956315921
68	0.0543194	0.945680628
69	0.0570063	0.942993748
70	0.0650619	0.93493814
71	0.0689446	0.931055374
72	0.0701585	0.929841483
73	0.0751642	0.924835818
74	0.0841942	0.915805753
75	0.0966591	0.903340948
76	0.0924332	0.907566766
77	0.1064653	0.893534686
78	0.1196952	0.880304807
79	0.120283	0.879716981
80	0.1454275	0.854572491
81	0.1555279	0.844472094
82	0.1489215	0.851078476
83	0.1446223	0.855377703
84	0.1782364	0.821763602
85	0.1942067	0.805793285
86	0.1908326	0.809167446
87	0.2210275	0.778972521
88	0.2428161	0.757183908
89	0.2016129	0.798387097
90	0.2536232	0.746376812
91	0.3533333	0.646666667
92	0.3021583	0.697841727
93	0.2352941	0.764705882
94	0.4871795	0.512820513
95	0.2380952	0.761904762
96	0.5	0.5
97	0.4285714	0.571428571
98	0	1
99	0.25	0.75
100+	0.625	0.375

C. Female

Age	Death Rate	Survival Ratio
0	0.0129426	0.987057393
1	0.0051909	0.994809082
2	0.0038586	0.996141438
3	0.0022294	0.997770556
4	0.0011592	0.998840759
5	0.0007709	0.999229129
6	0.0005855	0.999414462
7	0.0003991	0.999600888
8	0.0002969	0.999703071
9	0.0003016	0.999698433
10	0.0002846	0.999715388
11	0.0002317	0.999768331
12	0.0002399	0.99976014
13	0.0002314	0.999768648
14	0.00023	0.99977003
15	0.0003165	0.999683508
16	0.0003394	0.999660644
17	0.0004276	0.9995724
18	0.000388	0.999611993
19	0.0005254	0.999474569
20	0.0006005	0.999399545
21	0.000467	0.999532975
22	0.0005611	0.999438901
23	0.0006518	0.999348167
24	0.0006788	0.999321179
25	0.0006758	0.999324213
26	0.0006184	0.999381584
27	0.0006827	0.999317268
28	0.0006979	0.999302119
29	0.0006868	0.999313183
30	0.0006566	0.999343444
31	0.0006282	0.999371781
32	0.0007376	0.9992624
33	0.00075	0.999249953
34	0.000781	0.99921897
35	0.0007075	0.999292489
36	0.000559	0.999441004
37	0.0008447	0.999155255
38	0.0008113	0.999188654
39	0.000772	0.999228033
40	0.0008942	0.999105815
41	0.0009259	0.999074124
42	0.0012439	0.99875609
43	0.0011123	0.99888772
44	0.0011712	0.998828819
45	0.0013873	0.998612703
46	0.0014913	0.998508673
47	0.0017765	0.998223517
48	0.0015769	0.998423117
49	0.0017711	0.998228922
50	0.0024258	0.997574222
51	0.0021917	0.997808309

52	0.0022892	0.997710837
53	0.0028815	0.997118536
54	0.0031449	0.996855053
55	0.0036992	0.996300846
56	0.004649	0.995350984
57	0.0047281	0.995271868
58	0.0052635	0.994736451
59	0.0058875	0.994112455
60	0.0090675	0.990932476
61	0.0089709	0.991029067
62	0.0095358	0.990464207
63	0.0105805	0.989419499
64	0.012652	0.987347995
65	0.0131502	0.986849837
66	0.0161205	0.983879508
67	0.017458	0.982542026
68	0.0205393	0.979460651
69	0.0226062	0.977393792
70	0.0284689	0.971531148
71	0.0296188	0.970381195
72	0.0316546	0.968345407
73	0.0378974	0.962102634
74	0.0440616	0.955938389
75	0.0561807	0.943819281
76	0.0533438	0.946656223
77	0.0586839	0.941316073
78	0.0741323	0.925867709
79	0.0802274	0.919772639
80	0.0963079	0.903692066
81	0.0887354	0.911264557
82	0.1038256	0.896174439
83	0.1114845	0.88851546
84	0.1322967	0.867703255
85	0.1371269	0.862873134
86	0.1295316	0.870468352
87	0.1622289	0.837771068
88	0.1541749	0.845825115
89	0.1651515	0.834848485
90	0.1813584	0.818641618
91	0.1840607	0.815939279
92	0.198123	0.801876955
93	0.1447368	0.855263158
94	0.2386364	0.761363636
95	0.1888889	0.811111111
96	0.2057762	0.794223827
97	0.2931034	0.706896552
98	0.2123894	0.787610619
99	0.2058824	0.794117647
100+	0.3935484	0.606451613

1-3. Estimated Number of Deaths

A. Total

Age	1994	1995	1996	1997	1998	1999.8.31
0	12321	13053	13359	13531	13517	7403
1	2226	2120	2321	2385	2431	1630
2	1603	1644	1566	1714	1762	1196
3	920	929	953	908	994	680
4	510	509	514	528	502	366
5	318	348	347	351	360	228
6	276	276	302	301	305	208
7	185	185	185	202	202	136
8	145	149	149	149	163	108
9	141	138	141	141	141	103
10	115	122	119	123	122	82
11	109	106	112	110	113	75
12	94	97	94	100	98	67
13	99	98	101	98	105	68
14	115	117	116	120	116	82
15	119	127	130	129	133	86
16	123	144	154	157	156	107
17	137	139	162	174	177	117
18	156	136	139	162	174	118
19	195	192	167	170	198	141
20	199	217	214	186	189	146
21	219	166	183	180	157	107
22	248	257	195	214	212	123
23	291	281	292	222	242	159
24	288	282	272	283	216	156
25	353	321	313	302	314	158
26	371	336	305	297	286	198
27	350	424	383	347	338	217
28	351	367	444	402	363	235
29	351	362	378	458	414	248
30	338	329	340	355	430	259
31	304	331	323	333	349	281
32	320	365	399	389	401	279
33	336	316	361	394	384	264
34	328	346	326	372	406	264
35	376	315	333	313	358	260
36	337	335	281	297	280	213
37	270	427	425	357	377	236
38	311	280	443	442	370	261
39	270	311	281	444	443	247
40	263	311	359	324	513	340
41	219	270	320	369	333	351
42	361	354	437	518	597	359
43	494	284	278	343	407	313
44	526	525	302	296	365	288
45	610	609	608	350	343	282
46	688	697	696	695	399	261
47	711	705	715	713	712	273
48	717	756	749	760	758	504
49	714	731	770	764	774	514

50	1003	1004	1027	1082	1073	724
51	1039	891	892	913	962	635
52	1023	1140	978	979	1001	702
53	1189	1232	1373	1177	1179	803
54	1290	1324	1372	1529	1311	874
55	1896	1679	1723	1785	1990	1136
56	1885	2133	1885	1935	2005	1487
57	1916	2023	2287	2023	2077	1432
58	1963	2117	2235	2527	2236	1528
59	2008	2324	2509	2649	2992	1765
60	2890	2674	3080	3318	3503	2640
61	2695	3073	2844	3285	3544	2491
62	2504	2900	3307	3062	3539	2542
63	2778	2645	3065	3494	3234	2485
64	2699	3078	2927	3395	3867	2382
65	2645	2710	3090	2938	3407	2583
66	2723	3051	3123	3559	3380	2611
67	2648	2697	3020	3088	3517	2220
68	3041	3111	3168	3549	3630	2753
69	2952	3131	3200	3258	3649	2482
70	3072	3385	3589	3663	3728	2779
71	3202	3074	3386	3590	3665	2482
72	3147	3178	3052	3358	3560	2417
73	3056	3394	3439	3302	3628	2559
74	2816	3298	3669	3723	3575	2613
75	3117	3224	3769	4203	4278	2735
76	3000	2754	2847	3326	3712	2517
77	2544	3129	2872	2969	3470	2577
78	2514	2839	3503	3212	3312	2571
79	2598	2414	2726	3370	3088	2116
80	2498	2832	2633	2974	3679	2243
81	2308	2148	2436	2261	2553	2100
82	1751	2271	2093	2372	2212	1663
83	1472	1610	2104	1930	2187	1360
84	1183	1552	1698	2218	2035	1535
85	999	1063	1394	1525	1993	1217
86	740	809	860	1127	1233	1074
87	639	782	853	904	1178	860
88	525	518	632	689	732	637
89	333	440	435	536	583	409
90	258	310	410	405	498	361
91	193	225	270	358	353	287
92	182	158	180	217	287	189
93	100	105	92	104	126	111
94	74	144	151	131	150	120
95	59	41	78	82	73	54
96	49	55	38	73	77	45
97	38	53	58	40	76	53
98	19	18	26	28	20	25
99	13	16	15	21	22	10
100+	39	59	59	57	66	49
Sum	116738	123073	129329	135588	141739	96841

B. Male

Age	1994	1995	1996	1997	1998	1999.8.31
0	6779	7180	7347	7442	7435	4071
1	1136	1080	1182	1215	1238	830
2	819	838	797	872	896	608
3	473	478	489	465	509	348
4	279	277	280	287	273	199
5	177	194	193	195	200	126
6	169	169	185	185	187	127
7	112	112	112	123	122	82
8	92	95	94	95	104	69
9	86	84	86	86	86	63
10	66	70	69	71	71	47
11	68	66	70	68	70	47
12	53	55	53	56	55	38
13	59	59	60	58	62	40
14	76	78	77	80	77	55
15	69	74	75	75	77	50
16	74	90	97	99	98	67
17	71	78	95	101	103	68
18	86	76	83	101	108	74
19	99	98	86	94	115	82
20	85	107	106	93	102	83
21	110	77	97	96	85	62
22	124	127	89	112	111	65
23	143	137	140	98	124	81
24	134	128	122	125	88	74
25	201	168	160	153	157	73
26	223	197	165	157	150	102
27	215	260	230	193	184	117
28	219	229	277	245	205	130
29	226	232	243	294	260	145
30	216	210	216	226	274	161
31	198	215	209	215	225	181
32	209	241	262	255	262	183
33	216	203	235	255	248	170
34	209	221	208	241	262	169
35	250	207	220	207	239	173
36	237	236	196	208	196	151
37	175	276	275	229	242	152
38	209	189	298	298	247	174
39	186	214	194	307	306	169
40	180	214	247	224	353	235
41	150	184	219	253	229	241
42	265	262	321	383	442	266
43	347	198	196	241	287	220
44	371	370	212	209	257	204
45	427	426	425	243	240	196
46	493	500	499	498	285	187
47	478	473	480	479	479	182
48	521	550	544	552	551	366
49	500	510	539	533	541	359
50	711	711	726	766	758	512
51	731	628	628	641	677	446

52	734	818	703	703	718	505
53	841	870	969	833	833	566
54	919	945	978	1089	936	623
55	1380	1244	1279	1323	1475	843
56	1334	1487	1341	1379	1426	1058
57	1386	1465	1633	1472	1514	1043
58	1399	1530	1617	1802	1625	1112
59	1425	1696	1856	1961	2186	1312
60	1912	1780	2119	2319	2450	1818
61	1837	2114	1968	2343	2564	1803
62	1738	1996	2297	2139	2546	1855
63	1861	1804	2072	2384	2220	1759
64	1733	1993	1932	2219	2553	1583
65	1652	1719	1976	1916	2201	1686
66	1645	1848	1924	2212	2145	1640
67	1509	1548	1739	1811	2081	1343
68	1727	1794	1840	2068	2153	1648
69	1608	1714	1781	1826	2053	1423
70	1539	1730	1844	1917	1966	1471
71	1589	1525	1714	1827	1899	1297
72	1556	1506	1445	1624	1731	1198
73	1450	1550	1500	1439	1618	1148
74	1246	1502	1605	1554	1491	1116
75	1223	1310	1579	1688	1634	1043
76	1131	1057	1132	1364	1458	940
77	1008	1182	1105	1183	1426	1015
78	899	1013	1188	1110	1189	954
79	897	795	896	1051	982	700
80	836	954	846	953	1117	695
81	739	764	872	773	871	680
82	552	597	618	705	625	469
83	441	457	494	510	583	344
84	312	464	481	521	538	409
85	238	280	416	431	466	321
86	165	188	221	329	341	246
87	144	155	176	207	309	213
88	128	123	132	151	178	176
89	60	80	78	83	95	74
90	52	60	81	78	84	63
91	34	54	63	84	81	58
92	29	19	30	35	46	30
93	15	16	10	16	19	17
94	10	24	25	16	26	20
95	4	2	6	6	4	4
96	4	6	4	10	10	4
97	2	2	3	2	4	3
98	0	0	0	0	0	0
99	2	2	1	1	1	0
100+	2	5	5	3	2	2
Sum	62740	65938	69104	72266	75419	51450

C. Female

Age	1994	1995	1996	1997	1998	1999.8.31
0	5542	5874	6012	6089	6082	3332
1	1090	1040	1139	1171	1194	800
2	784	806	769	842	866	588
3	447	451	464	443	485	332
4	232	232	234	241	230	167
5	141	154	154	155	160	102
6	107	107	117	117	118	81
7	73	73	73	80	80	54
8	53	54	54	54	59	39
9	55	54	55	55	55	40
10	49	52	51	52	52	35
11	41	40	42	41	42	28
12	41	42	41	44	43	29
13	40	40	41	40	42	27
14	39	40	39	41	40	28
15	50	54	55	54	56	36
16	49	54	58	59	58	40
17	66	62	67	72	74	49
18	70	60	56	61	66	45
19	96	95	81	76	83	59
20	114	110	108	93	87	63
21	109	89	85	84	72	45
22	124	131	106	102	101	57
23	148	144	152	123	119	78
24	154	154	150	158	129	82
25	152	153	153	149	157	85
26	148	139	140	140	136	96
27	135	163	153	154	155	100
28	132	138	167	157	158	105
29	125	130	136	164	154	103
30	122	119	124	129	157	98
31	106	117	114	118	124	100
32	111	124	137	134	139	97
33	120	113	126	139	136	94
34	119	125	117	131	145	94
35	126	108	113	106	119	87
36	100	99	85	89	84	63
37	95	151	150	128	135	84
38	102	91	145	144	123	86
39	84	97	87	138	137	78
40	83	97	112	100	159	106
41	69	86	101	116	104	110
42	96	93	115	135	156	93
43	147	86	83	103	120	93
44	155	154	90	87	108	84
45	184	183	183	107	103	85
46	195	197	197	196	114	73
47	233	232	235	234	233	91
48	197	206	205	208	207	138
49	215	221	231	230	233	155
50	292	293	302	316	315	212
51	308	263	264	272	285	189

52	288	321	275	276	283	198
53	348	362	404	345	346	237
54	371	379	394	439	375	251
55	516	435	444	462	515	293
56	551	646	544	556	579	429
57	529	558	654	551	563	390
58	564	587	618	725	611	415
59	584	628	653	688	806	452
60	978	893	961	999	1054	822
61	858	959	876	942	980	688
62	766	904	1010	923	992	687
63	917	841	994	1110	1014	726
64	966	1085	995	1176	1313	799
65	994	991	1114	1022	1206	897
66	1078	1202	1199	1347	1236	972
67	1139	1149	1281	1277	1435	877
68	1314	1316	1328	1481	1477	1105
69	1344	1417	1419	1432	1596	1060
70	1533	1654	1744	1747	1762	1308
71	1613	1550	1672	1763	1766	1186
72	1591	1673	1607	1734	1828	1219
73	1606	1844	1939	1863	2010	1411
74	1570	1796	2063	2169	2084	1497
75	1894	1913	2189	2515	2644	1691
76	1870	1698	1715	1962	2254	1577
77	1536	1947	1768	1786	2043	1563
78	1616	1827	2315	2102	2123	1618
79	1701	1619	1830	2320	2106	1416
80	1662	1878	1787	2021	2562	1548
81	1569	1384	1563	1488	1683	1420
82	1199	1673	1475	1667	1587	1194
83	1032	1154	1610	1420	1604	1017
84	871	1088	1217	1698	1497	1126
85	761	784	978	1094	1527	896
86	575	620	639	797	892	828
87	495	627	676	696	869	647
88	397	394	499	538	554	461
89	273	359	357	453	488	334
90	205	250	330	327	415	298
91	158	171	208	274	272	229
92	152	139	150	183	240	159
93	85	89	81	88	107	94
94	64	119	126	115	124	100
95	55	39	72	76	69	50
96	45	49	34	64	67	41
97	36	51	55	39	72	50
98	19	18	26	28	20	25
99	11	14	14	20	22	10
100+	37	54	55	55	64	47
Sum	53998	57136	60226	63322	66321	45391

1-4. The 1993 Fertility Rates By Mother's Age

Age	Total	Male	Female
20	0.002358	0.00117	0.001188
21	0.009575	0.004915	0.004659
22	0.032456	0.016636	0.01582
23	0.077203	0.039807	0.037396
24	0.205223	0.104417	0.100806
25	0.268947	0.141354	0.127593
26	0.288672	0.144314	0.144358
27	0.293132	0.150145	0.142987
28	0.272097	0.138266	0.133831
29	0.232419	0.118565	0.113854
30	0.183789	0.094723	0.089066
31	0.131857	0.067223	0.064634
32	0.082535	0.042828	0.039707
33	0.056191	0.029019	0.027172
34	0.041624	0.021827	0.019796
35	0.02848	0.014577	0.013903
36	0.021882	0.011557	0.010325
37	0.013137	0.006919	0.006218
38	0.011453	0.00578	0.005673
39	0.009949	0.005337	0.004611
40	0.006184	0.003496	0.002688
41	0.003871	0.002033	0.001837
42	0.003231	0.001845	0.001387
43	0.002977	0.001433	0.001544
44	0.002017	0.001212	0.000805
45	0.001365	0.000846	0.000519
46	0.001145	0.000771	0.000374
47	0.001146	0.000743	0.000404
48	0.001078	0.000573	0.000505
49	0.001149	0.000702	0.000447

1-5. Estimated Births (By Mother's Age)

A. Total

Mother's Age	1994	1995	1996	1997	1998	1999.8.31
20	439	428	394	352	356	253
21	2025	1781	1735	1599	1427	947
22	7368	6860	6034	5879	5418	3254
23	17280	17517	16308	14346	13978	8800
24	46531	45904	46534	43323	38111	24774
25	60691	60938	60117	60942	56736	33444
26	66942	65099	65363	64483	65367	41913
27	63994	67934	66064	66332	65438	43763
28	52580	59362	63016	61281	61530	40598
29	43085	44881	50670	53789	52308	34965
30	33766	34047	35466	40041	42506	27483
31	23352	24209	24410	25428	28708	20502
32	13160	14608	15144	15270	15906	11577
33	8713	8953	9938	10303	10388	7152
34	6493	6450	6627	7356	7626	5087
35	4700	4439	4410	4531	5029	3484
36	3902	3609	3408	3386	3479	2530
37	1912	2341	2165	2045	2031	1363
38	1362	1665	2039	1886	1782	1190
39	1165	1182	1445	1770	1637	1021
40	623	724	734	898	1099	695
41	323	389	453	459	561	458
42	245	270	325	377	383	288
43	311	225	248	299	347	239
44	266	211	152	168	202	153
45	180	180	142	103	114	89
46	150	151	151	119	86	61
47	150	150	151	151	119	58
48	138	141	141	142	141	81
49	141	147	150	150	151	100

B. Male

Mother's Age	1994	1995	1996	1997	1998	1999.8.31
20	218	212	196	174	177	126
21	1039	914	891	821	732	486
22	3777	3516	3093	3014	2777	1668
23	8910	9032	8409	7397	7207	4537
24	23675	23356	23676	22043	19391	12605
25	31898	32028	31597	32030	29820	17578
26	33466	32545	32677	32236	32679	20953
27	32778	34796	33838	33976	33518	22416
28	26718	30165	32022	31140	31266	20630
29	21979	22895	25849	27440	26684	17837
30	17403	17547	18279	20637	21907	14164
31	11905	12342	12445	12964	14636	10452
32	6829	7580	7858	7924	8254	6007
33	4500	4624	5132	5321	5365	3693
34	3405	3382	3475	3857	3999	2668
35	2406	2272	2257	2319	2574	1783
36	2061	1906	1800	1788	1837	1336
37	1007	1233	1140	1077	1070	718
38	688	840	1029	952	899	601
39	625	634	775	950	878	548
40	352	409	415	508	622	393
41	170	205	238	241	295	241
42	140	154	185	215	219	164
43	150	108	119	144	167	115
44	160	126	92	101	122	92
45	112	112	88	64	70	55
46	101	102	102	80	58	41
47	97	97	98	98	77	37
48	73	75	75	75	75	43
49	86	90	91	92	92	61

C. Female

Mother's Age	1994	1995	1996	1997	1998	1999.8.31
20	221	215	199	177	179	128
21	985	867	844	778	694	461
22	3591	3344	2941	2866	2641	1586
23	8370	8485	7900	6949	6771	4262
24	22856	22548	22858	21280	18720	12169
25	28793	28910	28520	28912	26917	15866
26	33476	32554	32686	32246	32688	20960
27	31216	33138	32225	32356	31920	21347
28	25861	29197	30995	30141	30263	19968
29	21106	21986	24822	26350	25624	17128
30	16363	16499	17187	19404	20599	13318
31	11447	11867	11966	12464	14072	10050
32	6331	7028	7286	7346	7652	5569
33	4214	4329	4806	4982	5023	3458
34	3088	3068	3152	3499	3627	2419
35	2295	2167	2153	2212	2455	1701
36	1841	1703	1608	1598	1641	1194
37	905	1108	1025	968	962	645
38	675	825	1010	934	882	590
39	540	548	670	820	759	473
40	271	315	319	390	478	302
41	154	185	215	218	266	217
42	105	116	139	162	164	124
43	161	117	129	155	180	124
44	106	84	61	67	81	61
45	69	68	54	39	43	34
46	49	49	49	39	28	20
47	53	53	53	53	42	20
48	64	66	66	66	66	38
49	55	57	58	59	59	39

1-6. Life Table (Total Population)

X	Q_x	p_x	l_x	d_x	L_x	T_x	e_x
0	0.014033	0.985967	100000	1403	99018	7257974	72.580
1	0.005168	0.994832	98597	510	98342	7158956	72.608
2	0.003837	0.996163	98087	376	97899	7060614	71.983
3	0.002233	0.997767	97711	218	97602	6962715	71.258
4	0.001239	0.998761	97493	121	97432	6865113	70.417
5	0.000846	0.999154	97372	82	97331	6767681	69.503
6	0.000735	0.999265	97290	72	97254	6670351	68.562
7	0.000492	0.999508	97218	48	97194	6573097	67.612
8	0.000396	0.999604	97170	39	97151	6475903	66.645
9	0.000376	0.999624	97132	37	97113	6378752	65.671
10	0.000327	0.999673	97095	32	97079	6281638	64.696
11	0.000300	0.999700	97063	29	97049	6184559	63.717
12	0.000268	0.999732	97034	26	97021	6087511	62.736
13	0.000279	0.999721	97008	27	96995	5990489	61.752
14	0.000331	0.999669	96981	32	96965	5893495	60.770
15	0.000367	0.999633	96949	36	96931	5796530	59.789
16	0.000439	0.999561	96913	43	96892	5699598	58.811
17	0.000492	0.999508	96871	48	96847	5602706	57.837
18	0.000486	0.999514	96823	47	96800	5505859	56.865
19	0.000600	0.999400	96776	58	96747	5409060	55.892
20	0.000657	0.999343	96718	64	96686	5312312	54.926
21	0.000556	0.999444	96655	54	96628	5215626	53.962
22	0.000656	0.999344	96601	63	96569	5118998	52.991
23	0.000744	0.999256	96537	72	96501	5022429	52.026
24	0.000722	0.999278	96466	70	96431	4925928	51.064
25	0.000821	0.999179	96396	79	96356	4829497	50.101
26	0.000787	0.999213	96317	76	96279	4733141	49.141
27	0.000900	0.999100	96241	87	96198	4636862	48.180
28	0.000944	0.999056	96154	91	96109	4540664	47.223
29	0.000977	0.999023	96064	94	96017	4444555	46.267
30	0.000919	0.999081	95970	88	95926	4348539	45.312
31	0.000904	0.999096	95882	87	95838	4252613	44.353
32	0.001084	0.998916	95795	104	95743	4156775	43.392
33	0.001072	0.998928	95691	103	95640	4061032	42.439
34	0.001105	0.998895	95588	106	95536	3965392	41.484
35	0.001068	0.998932	95483	102	95432	3869857	40.529
36	0.000955	0.999045	95381	91	95335	3774425	39.572
37	0.001214	0.998786	95290	116	95232	3679090	38.610
38	0.001259	0.998741	95174	120	95114	3583858	37.656
39	0.001263	0.998737	95054	120	94994	3488744	36.703
40	0.001455	0.998545	94934	138	94865	3393750	35.748
41	0.001500	0.998500	94796	142	94725	3298885	34.800
42	0.002421	0.997579	94654	229	94539	3204160	33.851
43	0.001917	0.998083	94425	181	94334	3109620	32.932
44	0.002041	0.997959	94244	192	94147	3015286	31.995
45	0.002369	0.997631	94051	223	93940	2921139	31.059
46	0.002712	0.997288	93828	254	93701	2827199	30.132
47	0.002790	0.997210	93574	261	93443	2733498	29.212
48	0.002971	0.997029	93313	277	93174	2640054	28.292
49	0.003040	0.996960	93036	283	92894	2546880	27.375
50	0.004290	0.995710	92753	398	92554	2453986	26.457
51	0.003825	0.996175	92355	353	92178	2361432	25.569

52	0.004211	0.995789	92002	387	91808	2269253	24.665
53	0.005100	0.994900	91614	467	91381	2177445	23.768
54	0.005702	0.994298	91147	520	90887	2086065	22.887
55	0.007337	0.992663	90627	665	90295	1995178	22.015
56	0.008413	0.991587	89962	757	89584	1904883	21.174
57	0.009103	0.990897	89206	812	88800	1815299	20.350
58	0.010023	0.989977	88394	886	87951	1726499	19.532
59	0.011663	0.988337	87508	1021	86997	1638549	18.725
60	0.015635	0.984365	86487	1352	85811	1551551	17.940
61	0.016777	0.983223	85135	1428	84421	1465741	17.217
62	0.018523	0.981477	83706	1550	82931	1381320	16.502
63	0.019638	0.980362	82156	1613	81349	1298389	15.804
64	0.022061	0.977939	80542	1777	79654	1217040	15.111
65	0.022400	0.977600	78766	1764	77883	1137386	14.440
66	0.026381	0.973619	77001	2031	75986	1059502	13.760
67	0.026700	0.973300	74970	2002	73969	983517	13.119
68	0.032015	0.967985	72968	2336	71800	909548	12.465
69	0.033946	0.966054	70632	2398	69433	837747	11.861
70	0.039937	0.960063	68235	2725	66872	768314	11.260
71	0.041658	0.958342	65509	2729	64145	701442	10.707
72	0.043776	0.956224	62780	2748	61406	637297	10.151
73	0.049876	0.950124	60032	2994	58535	575891	9.593
74	0.056203	0.943797	57038	3206	55435	517356	9.070
75	0.067582	0.932418	53832	3638	52013	461921	8.581
76	0.063777	0.936223	50194	3201	48594	409907	8.166
77	0.071866	0.928134	46993	3377	45304	361314	7.689
78	0.086252	0.913748	43616	3762	41735	316009	7.245
79	0.091001	0.908999	39854	3627	38040	274275	6.882
80	0.109101	0.890899	36227	3952	34251	236234	6.521
81	0.103747	0.896253	32275	3348	30600	201983	6.258
82	0.115222	0.884778	28926	3333	27260	171383	5.925
83	0.119928	0.880072	25593	3069	24059	144123	5.631
84	0.142372	0.857628	22524	3207	20921	120064	5.331
85	0.148032	0.851968	19317	2860	17887	99144	5.132
86	0.140149	0.859851	16458	2307	15304	81256	4.937
87	0.173214	0.826786	14151	2451	12926	65952	4.661
88	0.170680	0.829320	11700	1997	10701	53027	4.532
89	0.170918	0.829082	9703	1658	8874	42325	4.362
90	0.193373	0.806627	8045	1556	7267	33451	4.158
91	0.205150	0.794850	6489	1331	5823	26185	4.035
92	0.211293	0.788707	5158	1090	4613	20361	3.948
93	0.154746	0.845254	4068	630	3753	15748	3.871
94	0.263427	0.736573	3438	906	2986	11995	3.489
95	0.191601	0.808399	2533	485	2290	9010	3.557
96	0.221843	0.778157	2047	454	1820	6720	3.282
97	0.298343	0.701657	1593	475	1356	4899	3.075
98	0.201681	0.798319	1118	225	1005	3544	3.170
99	0.210526	0.789474	892	188	798	2539	2.844
100+	1.000000	0.000000	705	705	1740	1740	2.470

2. Estimation Results using Official Population Figures of 31 August 1999.8.31

2-1. Estimated Population

A. Total

Age	1993	1994	1995	1996	1997	1998	1999.8.31
0	416088	447905	459973	468486	471313	466884	458538
1	430828	403560	434421	446126	454382	457124	456264
2	417751	426050	399085	429604	441178	449343	451453
3	411963	414312	422543	395799	426067	437546	443294
4	411878	409989	412326	420518	393902	424025	431847
5	375776	410783	408899	411230	419400	392855	412949
6	375229	375094	410037	408157	410484	418639	401011
7	375550	374637	374503	409390	407514	409837	415308
8	365661	375153	374241	374107	408958	407083	408647
9	374367	365350	374834	373923	373788	408609	407366
10	351889	374065	365055	374531	373621	373486	396665
11	362999	351642	373802	364799	374268	373359	373274
12	350896	362765	351416	373561	364564	374027	373428
13	354202	350694	362557	351214	373347	364355	370650
14	347126	353990	350484	362339	351004	373123	367129
15	323772	346879	353738	350235	362082	350754	365467
16	280258	323517	346606	353459	349959	361796	354246
17	278596	279994	323208	346276	353122	349625	357491
18	320888	278302	279696	322861	345903	352743	350416
19	324784	320553	278011	279398	322513	345531	350063
20	302547	324366	320141	277652	279033	322089	337390
21	393602	302120	323901	319682	277254	278629	307279
22	377700	393132	301765	323510	319296	276918	277818
23	390744	377168	392580	301346	323051	318843	290643
24	398396	390120	376567	391956	300872	322533	319738
25	429689	397778	389516	375984	391350	300409	314803
26	470910	428932	397090	388845	375337	390679	330215
27	388589	470115	428212	396437	388209	374725	384910
28	371421	387839	469207	427392	395694	387486	378514
29	358916	370669	387053	468256	426533	394919	389459
30	367584	358164	369893	386243	467275	425648	404652
31	335844	366859	357458	369165	385483	466356	438686
32	294910	335192	366149	356767	368452	384739	438477
33	313079	294224	334409	365295	355936	367596	378424
34	296512	312359	293547	333636	364453	355116	362862
35	351522	295809	311617	292850	332840	363585	357387
36	352542	350716	295134	310905	292181	332076	352532
37	222207	351820	349997	294533	310271	291584	318071
38	246715	221628	350905	349087	293771	309466	297040
39	213468	246049	221028	349956	348143	292980	303410
40	180550	212889	245382	220428	349007	347198	310510
41	145761	179987	212223	244614	219737	347914	346706
42	149183	145292	179409	211540	243827	219028	304082
43	257661	148409	144534	178476	210436	242554	226161
44	257632	256601	147801	143939	177744	209570	230883

45	257761	256504	255478	147157	143309	176969	198067
46	253712	256451	255201	254180	146413	142582	164894
47	254808	252236	254960	253717	252703	145567	143020
48	241643	253283	250729	253437	252202	251193	180133
49	235153	240104	251667	249133	251824	250597	249924
50	233965	233620	238542	250028	247514	250188	249229
51	271929	231813	231475	236356	247735	245247	247076
52	243088	269699	229912	229579	234424	245708	244022
53	233292	240893	267267	227838	227511	232318	239691
54	226528	230741	238266	264354	225354	225035	228156
55	258953	223760	227921	235361	261134	222608	222222
56	224520	254885	220187	224280	231611	256978	231498
57	210963	220474	250356	216217	220235	227444	244076
58	196354	206852	216186	245559	212008	215947	220603
59	172867	192142	202370	211510	240329	207420	209833
60	185541	168557	187230	197139	206054	234231	212238
61	161514	179340	162920	180831	190337	198956	217270
62	136018	155730	172899	157063	174171	183251	188778
63	142377	130646	149667	166147	150925	167189	172997
64	123144	136416	125132	143439	159213	144620	154964
65	118885	117352	130009	119211	136742	151758	142391
66	103963	113209	111731	123790	113465	130237	139743
67	99774	98120	106882	105467	116860	107067	117924
68	95786	94092	92557	100853	99501	110257	103776
69	87653	89260	87676	86274	94044	92763	99633
70	77504	81319	82857	81381	80107	87356	86394
71	77503	70912	74408	75860	74504	73362	78015
72	72434	70632	64688	67881	69249	68006	67392
73	61664	65682	64211	58861	61771	63052	62237
74	50428	55107	58834	57655	52897	55515	56301
75	46371	44385	48503	51911	50999	46832	48341
76	47283	39682	37981	41504	44529	43855	41658
77	35645	40845	34298	32827	35872	38572	38258
78	29303	30186	34696	29155	27903	30491	32123
79	28658	23908	24670	28437	23911	22883	24556
80	23003	23083	19312	19956	23058	19398	18832
81	22435	17643	17730	14885	15408	17853	16097
82	15258	17482	13717	13808	11642	12077	13595
83	12299	11500	13281	10406	10486	8865	9239
84	8337	9140	8569	9951	7789	7855	7024
85	6774	5798	6338	5965	6979	5456	5635
86	5307	4631	3959	4314	4078	4813	4175
87	3704	3718	3250	2776	3016	2862	3305
88	3100	2332	2359	2065	1762	1910	1931
89	1950	1974	1496	1528	1340	1142	1261
90	1339	1236	1255	953	976	857	788
91	957	786	729	744	567	585	560
92	866	544	441	413	427	328	360
93	650	476	307	249	233	242	219
94	288	435	322	210	170	160	162
95	308	131	197	149	101	81	89
96	228	181	78	117	88	60	53
97	127	123	97	43	65	49	38
98	95	46	46	36	16	24	25
99	60	54	25	25	20	9	13

100+	97	130	49	21	17	14	10
Total	20522351	20733755	20956875	21187517	21419153	21644079	21787000

B. Male

Age	1993	1994	1995	1996	1997	1998	1999.8.31
0	213149	228985	235164	239475	240977	238678	234263
1	220786	206257	221581	227560	231731	233185	232849
2	214576	218348	203979	219134	225047	229173	230285
3	211464	212819	216560	202309	217340	223204	226107
4	211979	210449	211798	215521	201338	216297	220285
5	193007	211381	209856	211200	214913	200770	210749
6	192598	192628	210966	209443	210785	214490	205091
7	192717	192236	192265	210569	209049	210388	212882
8	187220	192477	191996	192026	210306	208788	209688
9	192041	187023	192274	191794	191823	210085	209079
10	179774	191857	186843	192089	191610	191639	203796
11	186063	179632	191705	186696	191938	191459	191478
12	180004	185917	179492	191555	186550	191788	191475
13	181345	179890	185800	179378	191434	186432	189915
14	177578	181218	179765	185670	179253	191301	187962
15	165840	177415	181052	179600	185500	179088	187105
16	135916	165692	177257	180891	179439	185334	181057
17	124312	135757	165499	177050	180679	179230	183149
18	140549	124160	135591	165296	176833	180458	179490
19	142173	140365	123997	135413	165079	176601	179005
20	112805	141961	140155	123812	135211	164832	172491
21	160319	112623	141731	139929	123612	134992	154696
22	156829	160083	112457	141523	139723	123430	130993
23	163840	156563	159812	112266	141283	139486	128646
24	171686	163533	156270	159513	112056	141019	139830
25	204918	171399	163260	156009	159246	111869	131118
26	231737	204487	171038	162916	155681	158911	127415
27	190989	231259	204065	170685	162580	155359	157495
28	182409	190528	230701	203573	170274	162188	157383
29	177042	181940	190038	230107	203049	169835	164456
30	181888	176558	181442	189518	229478	202494	180431
31	167219	181425	176108	180980	189036	228894	210960
32	144533	166795	180965	175661	180521	188556	215023
33	153209	144085	166278	180404	175117	179961	185303
34	144268	152746	143650	165776	179859	174588	177804
35	173559	143820	152272	143204	165261	179301	175800
36	173750	173023	143376	151802	142762	164751	174085
37	109842	173242	172518	142957	151358	142345	156940
38	121100	109467	172651	171929	142469	150842	144845
39	104739	120652	109062	172013	171293	141943	147500
40	87811	104341	120193	108648	171358	170642	151129
41	71306	87426	103883	119666	108171	170606	170127
42	72103	70985	87032	103415	119127	107683	149045
43	125647	71534	70425	86345	102599	118187	110662
44	125442	124902	71110	70008	85834	101991	112319
45	125313	124646	124110	70659	69563	85289	95983
46	123151	124398	123736	123203	70143	69055	79455
47	123883	122093	123329	122673	122145	69541	68826
48	116910	122857	121082	122308	121657	121133	86272
49	113973	115793	121683	119925	121139	120494	120154
50	113472	112901	114703	120538	118796	11999.8.319	119467
51	131251	111947	111384	113162	118918	117200	118037

52	117130	129683	110610	110053	111810	117497	116327
53	112522	115554	127938	109122	108572	110305	113999
54	108615	110718	113702	125887	107372	106831	107929
55	119439	106643	108708	111637	123601	105422	104919
56	105909	116478	103999	106013	108869	120537	108591
57	98977	103047	113330	101188	103147	105927	113501
58	89199	96002	99949	109924	98147	100047	101801
59	73752	86198	92772	96586	106225	94844	95941
60	77678	70694	82624	88926	92582	101821	94237
61	65846	73576	66961	78261	84229	87693	93547
62	55728	61904	69170	62952	73575	79186	81343
63	55690	51998	57761	64541	58739	68651	72221
64	46822	51697	48270	53620	59914	54527	60785
65	43315	43103	47591	44436	49360	55155	51813
66	37071	39771	39576	43697	40800	45322	48908
67	34545	33542	35985	35808	39537	36916	39830
68	31790	31307	30398	32612	32452	35831	34090
69	28204	28085	27658	26855	28811	28669	30806
70	23653	24754	24649	24274	23570	25286	25199
71	23052	20351	21298	21208	20886	20279	21380
72	22173	19642	17340	18147	18070	17796	17523
73	19293	18835	16685	14730	15415	15350	15240
74	14804	16181	15797	13994	12354	12929	12924
75	12654	12129	13258	12943	11465	10122	10488
76	12234	10029	9614	10508	10259	9087	8445
77	9467	9807	8040	7707	8424	8224	7582
78	7509	7304	7567	6203	5946	6499	6443
79	7460	5580	5428	5623	4610	4419	4810
80	5747	5535	4140	4027	4172	3420	3342
81	4751	3954	3807	2848	2770	2870	2550
82	3709	3165	2634	2537	1898	1846	1972
83	3046	2524	2154	1792	1726	1291	1310
84	1752	2101	1741	1485	1236	1190	979
85	1224	1082	1297	1075	917	763	775
86	865	714	631	757	627	535	497
87	652	511	422	373	447	370	344
88	527	343	269	222	196	235	220
89	297	252	164	129	106	94	124
90	206	169	143	93	73	60	57
91	97	94	77	65	42	33	31
92	97	23	23	19	16	10	13
93	65	34	8	8	7	6	5
94	20	32	17	4	4	3	3
95	16	0	0	0	0	0	1
96	8	8	0	0	0	0	0
97	4	0	0	0	0	0	0
98	6	0	0	0	0	0	0
99	6	6	0	0	0	0	0
100+	3	6	3	0	0	0	0
Total	9677663	9779680	9888161	10000677	10113919	10223704	10293248

C. Female

Age	1993	1994	1995	1996	1997	1998	1999.8.31
0	202939	218921	224810	229011	230336	228206	224275
1	210042	197303	212841	218566	222651	223939	223415
2	203175	207702	195105	210470	216131	220171	221168
3	200499	201493	205983	193490	208727	214342	217186
4	199899	199540	200529	204997	192564	207729	211562
5	182769	199402	199043	200030	204487	192085	202200
6	182631	182467	199072	198714	199699	204149	195920
7	182833	182402	182237	198822	198465	199448	202426
8	178441	182676	182245	182081	198652	198295	198959
9	182326	178327	182560	182129	181965	198525	198287
10	172115	182208	178212	182442	182011	181848	192869
11	176936	172010	182097	178103	182330	181900	181796
12	170892	176848	171924	182006	178015	182240	181953
13	172857	170804	176757	171836	181913	177923	180736
14	169548	172771	170719	176669	171751	181822	179167
15	157932	169464	172686	170635	176582	171666	178362
16	144342	157825	169349	172569	170519	176462	173189
17	154284	144237	157710	169226	172443	170395	174342
18	180339	154142	144105	157565	169071	172285	170925
19	182611	180189	154014	143985	157434	168930	171057
20	189742	182405	179986	153840	143822	157256	164899
21	233283	189498	182170	179754	153642	143637	152582
22	220871	233049	189308	181988	179574	153488	146825
23	226904	220605	232769	189080	181768	179357	161997
24	226710	226587	220297	232443	188815	181514	179908
25	224771	226380	226257	219976	232104	188540	183685
26	239173	224445	226051	225928	219657	231768	202799
27	197600	238856	224147	225752	225629	219365	227414
28	189012	197311	238506	223819	225421	225298	221131
29	181874	188729	197015	238149	223484	225083	225003
30	185696	181606	188451	196725	237798	223154	224221
31	168625	185434	181350	188185	196448	237463	227726
32	150377	168398	185184	181106	187932	196183	223454
33	159870	150139	168131	184891	180819	187634	193121
34	152244	159613	149897	167861	184594	180528	185058
35	177963	151989	159345	149646	167579	184284	181587
36	178792	177693	151758	159103	149419	167325	178447
37	112365	178578	177480	151576	158912	149240	161131
38	125615	112161	178254	177158	151301	158624	152195
39	108729	125396	111966	177943	176850	151038	155911
40	92739	108549	125189	111781	177649	176557	159381
41	74455	92561	108341	124948	111566	177308	176579
42	77080	74307	92377	108125	124700	111344	155038
43	132014	76874	74109	92131	107837	124367	115500
44	132190	131699	76691	73932	91911	107579	118564
45	132448	131858	131368	76498	73746	91680	102084
46	130561	132054	131465	130977	76270	73527	85439
47	130925	130143	131631	131045	130558	76026	74193
48	124733	130426	129647	131129	130545	130060	93860
49	121180	124311	129985	129208	130686	130103	129769

50	120493	120719	123839	129491	128717	130189	129762
51	140678	119866	120091	123194	128817	128047	129039
52	125958	140016	119302	119526	122615	128211	127695
53	120770	125339	139329	118716	118939	122012	125692
54	117913	120023	124564	138467	117982	118204	120227
55	139514	117117	119213	123724	137533	117186	117303
56	118611	138407	116188	118267	122742	136441	122907
57	111986	117428	137026	115029	117087	121517	130575
58	107155	110850	116236	135636	113862	115899	118802
59	99115	105945	109598	114924	134104	112575	113892
60	107863	97863	104606	108213	113472	132409	118001
61	95668	105764	95959	102571	106108	111264	123723
62	80290	93826	103728	94111	100596	104065	107434
63	86687	78647	91907	101606	92186	98538	100776
64	76322	84719	76862	89820	99299	90093	94179
65	75570	74250	82419	74775	87381	96603	90578
66	66892	73438	72155	80093	72665	84916	90835
67	65229	64578	70897	69659	77323	70151	78094
68	63996	62785	62159	68241	67049	74426	69685
69	59449	61175	60018	59419	65234	64094	68827
70	53851	56565	58208	57107	56537	62069	61196
71	54451	50561	53110	54652	53618	53083	56634
72	50261	50990	47348	49734	51179	50210	49869
73	42371	46847	47527	44132	46356	47702	46997
74	35624	38925	43037	43662	40543	42586	43377
75	33717	32256	35245	38968	39534	36710	37853
76	35049	29652	28367	30996	34271	34768	33214
77	26178	31037	26258	25120	27448	30348	30676
78	21794	22882	27129	22952	21957	23992	25680
79	21198	18327	19242	22813	19301	18464	19745
80	17256	17549	15172	15929	18886	15978	15489
81	17684	13690	13922	12037	12637	14983	13547
82	11549	14317	11083	11271	9745	10231	11623
83	9253	8976	11127	8614	8760	7574	7929
84	6585	7039	6829	8465	6553	6664	6046
85	5550	4716	5041	4890	6062	4693	4860
86	4442	3917	3328	3558	3451	4278	3678
87	3052	3207	2828	2403	2569	2492	2961
88	2573	1990	2091	1844	1566	1675	1711
89	1653	1722	1331	1399	1234	1048	1137
90	1133	1067	1112	860	903	797	730
91	860	692	652	679	525	552	529
92	769	520	419	394	411	318	347
93	585	442	299	241	227	236	214
94	268	403	305	206	166	156	159
95	292	131	197	149	101	81	88
96	220	174	78	117	88	60	53
97	123	123	97	43	65	49	38
98	89	46	46	36	16	24	25
99	54	48	25	25	20	9	13
100+	94	124	46	21	17	14	10
Total	10844688	10954074	11068714	11186840	11305234	11420375	11493751

2-2. Estimated Age Specific Death Rates

A. Total

Age	Death Rate	Survival Ratio
0	0.0301119	0.969888129
1	0.0110891	0.988910855
2	0.0082331	0.991766943
3	0.0047917	0.995208253
4	0.0026589	0.997341076
5	0.0018144	0.998185643
6	0.0015772	0.998422805
7	0.0010565	0.998943469
8	0.0008506	0.999149432
9	0.0008079	0.999192114
10	0.000701	0.999298961
11	0.0006441	0.999355856
12	0.0005747	0.999425321
13	0.0005996	0.999400409
14	0.0007107	0.999289345
15	0.0007884	0.999211612
16	0.0009413	0.999058655
17	0.0010547	0.998945311
18	0.0010427	0.998957317
19	0.0012876	0.998712428
20	0.0014105	0.998589521
21	0.0011933	0.998806734
22	0.001408	0.998591971
23	0.0015969	0.99840313
24	0.0015501	0.998449914
25	0.0017614	0.998238608
26	0.0016892	0.998310781
27	0.001931	0.998069016
28	0.0020259	0.997974079
29	0.0020964	0.997903563
30	0.0019713	0.998028699
31	0.0019406	0.998059404
32	0.0023258	0.997674151
33	0.0023004	0.997699556
34	0.0023711	0.997628935
35	0.0022928	0.997707216
36	0.0020493	0.997950744
37	0.0026042	0.997395822
38	0.0027015	0.99729847
39	0.0027107	0.997289346
40	0.0031212	0.996878825
41	0.0032192	0.996780838
42	0.0051943	0.994805679
43	0.0041145	0.995885519
44	0.0043804	0.995619583
45	0.0050827	0.994917278
46	0.00582	0.994180031
47	0.0059876	0.994012369
48	0.0063747	0.993625322

49	0.0065229	0.993477133
50	0.0092052	0.99079477
51	0.0082068	0.991793218
52	0.0090363	0.990963735
53	0.0109447	0.989055331
54	0.0122348	0.987765224
55	0.015744	0.984256008
56	0.0180536	0.981946447
57	0.019533	0.980467036
58	0.0215077	0.97849231
59	0.0250274	0.974972639
60	0.0335497	0.966450311
61	0.0360009	0.963999127
62	0.0397468	0.960253241
63	0.0421394	0.95786061
64	0.0473394	0.952660605
65	0.0480655	0.9519345
66	0.0566095	0.943390541
67	0.0572923	0.942707681
68	0.068698	0.931302032
69	0.0728413	0.927158728
70	0.0856965	0.914303534
71	0.0893912	0.910608772
72	0.0939342	0.906065753
73	0.1070245	0.892975456
74	0.1206019	0.879398113
75	0.1450189	0.854981082
76	0.1368539	0.863146149
77	0.1542103	0.845789698
78	0.1850797	0.814920281
79	0.195272	0.804727999
80	0.2341115	0.765888535
81	0.2226222	0.777377798
82	0.2472446	0.752755441
83	0.2573441	0.742655867
84	0.3055042	0.694495775
85	0.3176485	0.682351518
86	0.3007338	0.699266184
87	0.3716856	0.628314361
88	0.3662465	0.633753523
89	0.366759	0.633240974
90	0.4149436	0.585056449
91	0.4402127	0.559787327
92	0.453396	0.546603964
93	0.332057	0.667942957
94	0.5652656	0.434734419
95	0.4111402	0.588859785
96	0.4760338	0.523966177
97	0.6401876	0.359812398
98	0.4327692	0.56723079
99	0.4517503	0.548249684
100+	0.8688572	0.131142798

B. Male

Age	Death Rate	Survival Ratio
0	0.0323345	0.967665545
1	0.011042	0.988958042
2	0.0081888	0.991811163
3	0.0047991	0.99520088
4	0.0028205	0.99717946
5	0.001966	0.998033952
6	0.0018812	0.998118752
7	0.0012463	0.998753657
8	0.0010539	0.998946064
9	0.0009605	0.999039489
10	0.0007875	0.999212502
11	0.0007839	0.999216061
12	0.0006316	0.999368377
13	0.0006979	0.999302094
14	0.000918	0.999082025
15	0.0008924	0.999107576
16	0.0011677	0.998832339
17	0.0012249	0.998775132
18	0.0013122	0.998687809
19	0.0014932	0.998506835
20	0.0016157	0.998384319
21	0.0014713	0.998528698
22	0.0016953	0.998304709
23	0.0018712	0.998128761
24	0.0016735	0.99832651
25	0.0021027	0.997897276
26	0.0020629	0.997937073
27	0.0024129	0.997587132
28	0.0025732	0.997426828
29	0.0027357	0.997264289
30	0.0025452	0.997454774
31	0.0025378	0.997462198
32	0.0030984	0.996901555
33	0.003021	0.996979007
34	0.0031041	0.996895872
35	0.0030865	0.996913546
36	0.002923	0.997077035
37	0.0034133	0.996586733
38	0.003697	0.996303035
39	0.0038039	0.996196127
40	0.0043896	0.995610386
41	0.0045045	0.99549552
42	0.0078872	0.992112831
43	0.0059268	0.994073231
44	0.0063446	0.993655374
45	0.007304	0.992696031
46	0.0085905	0.991409525
47	0.0082821	0.991717868
48	0.0095566	0.990443396
49	0.0094099	0.990590097
50	0.0134364	0.986563646

51	0.0119495	0.98805045
52	0.0134536	0.986546449
53	0.0160318	0.983968241
54	0.018159	0.981841033
55	0.0247905	0.975209531
56	0.0270277	0.972972266
57	0.030055	0.969944966
58	0.0336482	0.96635178
59	0.0414583	0.958541749
60	0.0528114	0.947188585
61	0.0598735	0.940126543
62	0.0669238	0.933076209
63	0.0716947	0.928305269
64	0.0794386	0.920561367
65	0.0818165	0.918183455
66	0.0951986	0.904801354
67	0.0937379	0.906262091
68	0.1165593	0.883440732
69	0.1223248	0.877675186
70	0.1396107	0.86038935
71	0.1479423	0.852057656
72	0.1505471	0.849452872
73	0.1612884	0.838711646
74	0.1806652	0.819334806
75	0.2074123	0.792587653
76	0.1983445	0.801655472
77	0.2284548	0.771545239
78	0.2568436	0.743156378
79	0.258105	0.741895014
80	0.3120604	0.687939615
81	0.333734	0.666266042
82	0.3195579	0.68044211
83	0.3103325	0.68966745
84	0.3824622	0.617537842
85	0.4167315	0.583268512
86	0.4094912	0.590508834
87	0.4742839	0.525716141
88	0.5210382	0.47896183
89	0.4326238	0.56737621
90	0.5442282	0.455771812
91	0.7581876	0.241812387
92	0.6483755	0.351624547
93	0.5048974	0.495102588
94	1	0
95	0.5109081	0.489091905
96	1	0
97	0.9196346	0.080365429
98	0	1
99	0.5364535	0.4635465
100+	1	0

C. Female

Age	Death Rate	Survival Ratio
0	0.0277724	0.972227573
1	0.0111387	0.988861256
2	0.0082798	0.991720244
3	0.004784	0.995216029
4	0.0024875	0.997512485
5	0.0016541	0.998345854
6	0.0012565	0.998743545
7	0.0008564	0.99914358
8	0.0006372	0.999362846
9	0.0006471	0.999352894
10	0.0006107	0.999389275
11	0.0004971	0.999502882
12	0.0005147	0.999485305
13	0.0004964	0.999503562
14	0.0004935	0.999506526
15	0.0006791	0.999320868
16	0.0007282	0.999271804
17	0.0009175	0.999082451
18	0.0008326	0.999167409
19	0.0011275	0.998872522
20	0.0012885	0.998711535
21	0.0010021	0.99899785
22	0.001204	0.998795987
23	0.0013987	0.998601287
24	0.0014566	0.998543377
25	0.0014501	0.998549887
26	0.001327	0.998672994
27	0.001465	0.998534984
28	0.0014975	0.998502477
29	0.0014738	0.998526219
30	0.0014088	0.998591152
31	0.001348	0.998651959
32	0.0015828	0.998417247
33	0.0016095	0.998390539
34	0.0016759	0.998324056
35	0.0015182	0.998481812
36	0.0011995	0.998800498
37	0.0018127	0.998187335
38	0.001741	0.998259002
39	0.0016565	0.998343503
40	0.0019188	0.998081246
41	0.0019868	0.998013242
42	0.0026692	0.9973308
43	0.0023867	0.997613255
44	0.0025131	0.997486863
45	0.0029769	0.997023118
46	0.0032001	0.996799889
47	0.003812	0.996187997
48	0.0033837	0.996616302
49	0.0038004	0.996199596
50	0.0052053	0.994794732
51	0.004703	0.995297038

52	0.0049121	0.995087881
53	0.0061831	0.993816915
54	0.0067485	0.99325153
55	0.0079377	0.992062303
56	0.0099759	0.990024076
57	0.0101457	0.989854307
58	0.0112946	0.988705403
59	0.0126336	0.987366424
60	0.0194572	0.98054278
61	0.01925	0.980750047
62	0.020462	0.979537962
63	0.0227038	0.977296213
64	0.0271488	0.97285115
65	0.0282178	0.971782197
66	0.0345916	0.965408423
67	0.0374616	0.962538434
68	0.0440736	0.955926377
69	0.0485087	0.951491282
70	0.0610889	0.938911139
71	0.0635564	0.936443554
72	0.0679249	0.932075131
73	0.0813207	0.918679301
74	0.094548	0.905451978
75	0.1205534	0.879446627
76	0.1144658	0.885534176
77	0.1259248	0.874075209
78	0.1590741	0.840925892
79	0.172153	0.827847005
80	0.2066589	0.793341087
81	0.1904098	0.809590245
82	0.2227903	0.777209658
83	0.2392251	0.760774913
84	0.2838842	0.716115792
85	0.2942487	0.705751252
86	0.2779508	0.722049176
87	0.3481131	0.651886886
88	0.3308306	0.669169373
89	0.3543844	0.645615567
90	0.3891614	0.610838646
91	0.3949601	0.605039928
92	0.4251352	0.574864797
93	0.3105783	0.689421658
94	0.5120693	0.48793075
95	0.4053204	0.594679578
96	0.4415574	0.558442606
97	0.6289455	0.371054517
98	0.4557481	0.544251894
99	0.4417852	0.558214765
100+	0.8444816	0.155518361

2-3. Estimated Number of Deaths

A. Total

Age	1994	1995	1996	1997	1998	1999.8.31
0	26433	27764	28391	28735	28683	15674
1	4778	4475	4817	4947	5039	3375
2	3439	3508	3286	3537	3632	2463
3	1974	1985	2025	1897	2042	1396
4	1095	1090	1096	1118	1047	750
5	682	745	742	746	761	474
6	592	592	647	644	647	439
7	397	396	396	433	431	288
8	311	319	318	318	348	231
9	302	295	303	302	302	220
10	247	262	256	263	262	174
11	234	226	241	235	241	160
12	202	208	202	215	209	143
13	212	210	217	210	224	145
14	247	252	249	258	249	177
15	255	273	279	276	285	184
16	264	308	330	337	334	230
17	294	299	347	372	380	250
18	335	291	298	348	373	253
19	418	413	359	365	424	302
20	427	464	458	398	404	312
21	470	356	391	386	336	228
22	532	552	419	459	453	262
23	624	602	625	475	519	341
24	618	604	582	606	463	333
25	757	689	671	647	671	339
26	795	720	653	636	613	423
27	750	908	821	743	723	464
28	752	786	951	859	776	502
29	752	776	810	980	885	530
30	725	705	727	760	919	552
31	652	710	691	713	745	600
32	686	783	854	831	857	596
33	720	677	773	843	820	563
34	703	742	697	796	868	562
35	806	675	712	669	764	555
36	722	719	601	635	597	454
37	579	915	911	763	805	504
38	666	600	949	944	790	555
39	579	667	600	949	945	526
40	563	666	768	691	1093	724
41	469	578	683	787	709	746
42	774	758	933	1104	1272	763
43	1060	607	594	732	865	664
44	1128	1123	644	630	776	611
45	1310	1303	1298	744	728	596
46	1476	1491	1484	1478	847	552
47	1525	1507	1523	1516	1509	576
48	1539	1615	1596	1613	1604	1064

49	1533	1562	1639	1620	1637	1084
50	2152	2145	2186	2294	2266	1525
51	2230	1901	1896	1932	2027	1333
52	2195	2432	2074	2068	2107	1472
53	2551	2628	2913	2483	2476	1680
54	2768	2820	2905	3220	2746	1823
55	4068	3573	3641	3750	4156	2359
56	4046	4529	3970	4045	4167	3075
57	4111	4288	4796	4208	4288	2940
58	4212	4482	4676	5231	4588	3113
59	4310	4912	5231	5456	6098	3565
60	6201	5638	6399	6802	7097	5295
61	5784	6441	5856	6660	7086	4921
62	5372	6063	6752	6139	6982	4946
63	5961	5514	6228	6934	6304	4766
64	5792	6407	5921	6698	7455	4512
65	5676	5622	6219	5746	6504	4819
66	5843	6326	6264	6930	6398	4828
67	5682	5563	6029	5966	6603	4053
68	6526	6416	6283	6809	6738	4964
69	6334	6403	6295	6167	6689	4405
70	6592	6911	6997	6878	6744	4875
71	6871	6224	6526	6611	6498	4243
72	6752	6421	5827	6110	6197	4054
73	6557	6847	6556	5965	6256	4231
74	6043	6604	6923	6656	6065	4236
75	6689	6404	6999	7382	7144	4344
76	6438	5383	5154	5632	5958	3849
77	5459	6149	5143	4924	5381	3795
78	5396	5516	6259	5244	5020	3652
79	5575	4595	4714	5379	4513	2876
80	5360	5354	4427	4549	5205	2909
81	4953	3926	3922	3242	3331	2537
82	3758	4201	3311	3322	2777	1910
83	3159	2930	3330	2617	2631	1473
84	2539	2802	2604	2971	2333	1563
85	2143	1838	2024	1887	2166	1131
86	1589	1381	1183	1299	1216	938
87	1372	1359	1184	1013	1106	694
88	1126	837	832	725	620	450
89	714	719	543	551	483	274
90	553	507	511	385	391	228
91	413	345	316	318	240	162
92	390	236	193	180	185	94
93	215	155	97	79	74	51
94	157	239	173	110	89	55
95	127	53	80	60	41	22
96	105	85	34	52	39	18
97	81	77	61	27	41	21
98	41	21	21	16	7	7
99	27	25	11	11	9	3
100+	82	111	42	18	14	8
Sum	250489	251133	252387	254310	256451	169007

B. Male

Age	1994	1995	1996	1997	1998	1999.8.31
0	14544	15262	15606	15796	15767	8613
1	2438	2277	2447	2513	2559	1714
2	1757	1788	1670	1794	1843	1249
3	1015	1021	1039	971	1043	713
4	598	594	597	608	568	406
5	379	416	413	415	423	263
6	362	362	397	394	397	269
7	240	240	240	262	261	175
8	197	203	202	202	222	146
9	184	180	185	184	184	134
10	142	151	147	151	151	100
11	146	141	150	146	150	100
12	114	117	113	121	118	81
13	127	126	130	125	134	87
14	163	166	165	170	165	117
15	148	158	162	160	166	106
16	159	193	207	211	210	144
17	152	166	203	217	221	146
18	184	163	178	217	232	158
19	212	210	185	202	246	176
20	182	229	226	200	218	177
21	236	166	209	206	182	132
22	266	271	191	240	237	139
23	307	293	299	210	264	174
24	287	274	262	267	188	157
25	431	360	343	328	335	157
26	478	422	353	336	321	218
27	461	558	492	412	392	250
28	469	490	594	524	438	278
29	484	498	520	630	555	309
30	463	449	462	482	584	343
31	424	460	447	459	480	387
32	448	517	561	544	559	389
33	463	435	502	545	529	362
34	448	474	446	515	558	361
35	536	444	470	442	510	368
36	508	506	419	444	417	321
37	375	591	589	488	517	323
38	448	405	638	636	527	371
39	398	459	415	654	652	359
40	385	458	528	477	752	499
41	321	394	468	539	487	512
42	569	560	686	816	940	565
43	745	424	417	512	608	466
44	796	792	451	444	545	431
45	915	910	906	516	508	415
46	1058	1069	1063	1058	603	395
47	1026	1011	1021	1016	1012	383
48	1117	1174	1157	1169	1163	771
49	1072	1090	1145	1128	1140	755
50	1525	1517	1541	1620	1596	1073
51	1568	1338	1331	1352	1421	932

52	1576	1745	1488	1481	1504	1052
53	1804	1853	2051	1749	1741	1177
54	1972	2011	2065	2286	1950	1292
55	2961	2644	2695	2768	3064	1740
56	2862	3148	2811	2865	2942	2169
57	2975	3097	3406	3041	3100	2120
58	3001	3230	3363	3699	3302	2241
59	3058	3574	3846	4004	4404	2618
60	4102	3733	4363	4696	4889	3580
61	3942	4405	4009	4686	5043	3496
62	3730	4143	4629	4213	4924	3528
63	3993	3728	4141	4627	4211	3277
64	3719	4107	3835	4259	4759	2884
65	3544	3527	3894	3636	4038	3004
66	3529	3786	3768	4160	3884	2872
67	3238	3144	3373	3357	3706	2304
68	3705	3649	3543	3801	3783	2780
69	3450	3435	3383	3285	3524	2335
70	3302	3456	3441	3389	3291	2350
71	3410	3011	3151	3138	3090	1997
72	3338	2957	2610	2732	2720	1784
73	3112	3038	2691	2376	2486	1648
74	2675	2923	2854	2528	2232	1555
75	2625	2516	2750	2685	2378	1398
76	2427	1989	1907	2084	2035	1200
77	2163	2241	1837	1761	1924	1251
78	1929	1876	1944	1593	1527	1111
79	1925	1440	1401	1451	1190	759
80	1793	1727	1292	1257	1302	711
81	1586	1319	1271	951	925	638
82	1185	1012	842	811	606	393
83	945	783	668	556	536	267
84	670	803	666	568	473	303
85	510	451	541	448	382	212
86	354	292	258	310	257	146
87	309	242	200	177	212	117
88	275	179	140	115	102	81
89	128	109	71	56	46	27
90	112	92	78	51	40	22
91	74	71	58	49	32	17
92	63	15	15	12	10	4
93	33	17	4	4	3	2
94	20	32	17	4	4	2
95	8	0	0	0	0	0
96	8	8	0	0	0	0
97	4	0	0	0	0	0
98	0	0	0	0	0	0
99	3	3	0	0	0	0
100+	3	6	3	0	0	0
Sum	134622	134541	134961	135788	136869	90134

C. Female

Age	1994	1995	1996	1997	1998	1999.8.31
0	11890	12502	12785	12940	12916	7061
1	2340	2198	2371	2435	2480	1661
2	1682	1720	1615	1743	1790	1214
3	959	964	985	926	999	683
4	497	496	499	510	479	344
5	302	330	329	331	338	212
6	229	229	250	250	251	171
7	157	156	156	170	170	114
8	114	116	116	116	127	84
9	118	115	118	118	118	86
10	105	111	109	111	111	74
11	88	86	91	89	91	60
12	88	91	88	94	92	62
13	86	85	88	85	90	59
14	84	85	84	87	85	60
15	107	115	117	116	120	78
16	105	115	123	126	124	86
17	142	132	145	155	158	104
18	150	128	120	131	141	95
19	206	203	174	162	178	127
20	244	235	232	198	185	135
21	234	190	183	180	154	96
22	266	281	228	219	216	123
23	317	309	326	264	254	167
24	330	330	321	339	275	176
25	326	328	328	319	337	182
26	317	298	300	300	291	205
27	289	350	328	331	331	214
28	283	295	357	335	338	225
29	268	278	290	351	329	221
30	262	256	265	277	335	209
31	227	250	244	254	265	213
32	238	267	293	287	297	207
33	257	242	271	298	291	201
34	255	268	251	281	309	201
35	270	231	242	227	254	186
36	214	213	182	191	179	134
37	204	324	322	275	288	180
38	219	195	310	308	263	184
39	180	208	185	295	293	167
40	178	208	240	214	341	226
41	148	184	215	248	222	235
42	206	198	247	289	333	198
43	315	183	177	220	257	198
44	332	331	193	186	231	180
45	394	393	391	228	220	182
46	418	423	421	419	244	157
47	499	496	502	500	498	193
48	422	441	439	444	442	293
49	461	472	494	491	497	329
50	627	628	645	674	670	451
51	662	564	565	579	606	401

52	619	688	586	587	602	419
53	747	775	861	734	735	502
54	796	810	841	934	796	531
55	1107	930	946	982	1092	619
56	1183	1381	1159	1180	1224	906
57	1136	1191	1390	1167	1188	821
58	1210	1252	1313	1532	1286	871
59	1252	1338	1385	1452	1694	947
60	2099	1904	2035	2106	2208	1715
61	1842	2036	1847	1974	2043	1426
62	1643	1920	2122	1926	2058	1418
63	1968	1786	2087	2307	2093	1489
64	2072	2300	2087	2439	2696	1628
65	2132	2095	2326	2110	2466	1815
66	2314	2540	2496	2771	2514	1956
67	2444	2419	2656	2610	2897	1750
68	2821	2767	2740	3008	2955	2184
69	2884	2968	2911	2882	3164	2070
70	3290	3456	3556	3489	3454	2524
71	3461	3213	3375	3473	3408	2246
72	3414	3464	3216	3378	3476	2271
73	3446	3810	3865	3589	3770	2583
74	3368	3680	4069	4128	3833	2681
75	4065	3889	4249	4698	4766	2946
76	4012	3394	3247	3548	3923	2650
77	3296	3908	3307	3163	3456	2544
78	3467	3640	4315	3651	3493	2541
79	3649	3155	3313	3927	3323	2116
80	3566	3627	3135	3292	3903	2198
81	3367	2607	2651	2292	2406	1899
82	2573	3190	2469	2511	2171	1517
83	2214	2147	2662	2061	2096	1206
84	1869	1998	1939	2403	1860	1260
85	1633	1388	1483	1439	1784	919
86	1235	1089	925	989	959	792
87	1062	1117	985	837	894	578
88	851	658	692	610	518	369
89	586	610	472	496	437	247
90	441	415	433	335	352	206
91	340	273	257	268	207	145
92	327	221	178	168	175	90
93	182	137	93	75	70	49
94	137	207	156	106	85	53
95	118	53	80	60	41	22
96	97	77	34	52	39	18
97	77	77	61	27	41	21
98	41	21	21	16	7	7
99	24	21	11	11	9	3
100+	79	105	39	18	14	8
Sum	115867	116592	117426	118522	119583	78874

2-4. Estimated Number of Births using the 1993 Age Specific Birth Rates (By Mother's Age)

A. Total

Mother's Age	1994	1995	1996	1997	1998	1999.8.31
20	439	427	394	351	355	253
21	2024	1779	1733	1596	1423	944
22	7366	6854	6025	5867	5405	3245
23	17275	17501	16284	14315	13940	8773
24	46514	45855	46456	43226	38000	24690
25	60668	60868	60006	60793	56565	33324
26	66917	65023	65237	64314	65157	41759
27	63970	67860	65940	66157	65221	43595
28	52559	59292	62899	61118	61320	40435
29	43068	44827	50570	53646	52128	34822
30	33753	34006	35395	39930	42359	27370
31	23343	24182	24363	25358	28607	20418
32	13155	14591	15116	15229	15851	11529
33	8710	8942	9918	10275	10352	7122
34	6490	6442	6613	7335	7599	5065
35	4699	4433	4400	4517	5011	3469
36	3900	3605	3401	3376	3465	2519
37	1911	2339	2161	2039	2024	1357
38	1362	1663	2035	1881	1775	1185
39	1165	1181	1442	1765	1631	1017
40	622	723	733	895	1095	692
41	323	389	451	458	559	456
42	245	269	324	376	381	287
43	311	225	247	298	346	238
44	266	210	152	167	201	152
45	180	180	142	103	113	88
46	150	151	150	119	86	61
47	150	150	151	150	118	57
48	137	140	141	141	140	80
49	141	146	149	149	150	99

B. Male

Mother's Age	1994	1995	1996	1997	1998	1999.8.31
20	218	212	195	174	176	125
21	1039	913	889	819	731	485
22	3776	3513	3088	3007	2770	1663
23	8907	9024	8396	7381	7188	4523
24	23666	23331	23637	21993	19334	12562
25	31886	31991	31538	31952	29730	17514
26	33453	32507	32614	32152	32574	20876
27	32766	34759	33775	33886	33407	22330
28	26708	30129	31962	31057	31160	20547
29	21970	22868	25798	27367	26592	17764
30	17396	17526	18243	20580	21831	14106
31	11901	12328	12421	12928	14584	10410
32	6826	7572	7844	7902	8225	5982
33	4498	4618	5122	5306	5346	3678
34	3404	3378	3468	3847	3985	2656
35	2405	2269	2252	2312	2565	1775
36	2060	1904	1796	1783	1830	1330
37	1007	1232	1138	1074	1066	715
38	687	839	1027	949	896	598
39	625	633	774	947	875	545
40	352	409	414	506	619	391
41	170	204	237	240	294	240
42	140	154	185	215	218	164
43	150	108	119	143	166	114
44	160	126	91	100	121	91
45	112	111	88	64	70	55
46	101	102	101	80	58	41
47	97	97	98	97	77	37
48	73	75	75	75	75	43
49	86	89	91	91	92	61

C. Female

Mother's Age	1994	1995	1996	1997	1998	1999.8.31
20	221	215	198	177	179	127
21	985	866	843	777	693	459
22	3590	3341	2937	2860	2634	1581
23	8368	8477	7888	6934	6752	4249
24	22848	22524	22819	21233	18666	12128
25	28782	28877	28468	28841	26836	15809
26	33463	32516	32623	32162	32583	20882
27	31204	33102	32165	32271	31814	21265
28	25851	29163	30937	30061	30160	19888
29	21097	21959	24773	26279	25536	17058
30	16357	16480	17153	19351	20528	13264
31	11442	11853	11942	12430	14023	10009
32	6329	7020	7272	7327	7626	5547
33	4212	4324	4796	4969	5006	3444
34	3087	3064	3145	3489	3614	2409
35	2294	2164	2148	2205	2446	1693
36	1840	1701	1605	1593	1635	1188
37	905	1107	1023	965	958	642
38	674	824	1008	932	879	587
39	540	547	668	818	756	471
40	270	314	318	389	476	301
41	153	185	214	217	265	216
42	105	116	139	161	164	123
43	161	117	128	154	179	123
44	106	84	61	67	80	61
45	69	68	54	39	43	33
46	49	49	49	39	28	20
47	53	53	53	53	42	20
48	64	66	66	66	66	38
49	55	57	58	58	58	39

2-5. Life Table

X	q_x	P_x	l_x	d_x	L_x	T_x	e_x
0	0.030112	0.969888	100000	3011	97892	6281075	62.811
1	0.011089	0.988911	96989	1076	96451	6183183	63.752
2	0.008233	0.991767	95913	790	95518	6086732	63.461
3	0.004792	0.995208	95124	456	94896	5991214	62.983
4	0.002659	0.997341	94668	252	94542	5896318	62.284
5	0.001814	0.998186	94416	171	94330	5801776	61.449
6	0.001577	0.998423	94245	149	94170	5707446	60.560
7	0.001057	0.998943	94096	99	94046	5613275	59.655
8	0.000851	0.999149	93997	80	93957	5519229	58.717
9	0.000808	0.999192	93917	76	93879	5425272	57.767
10	0.000701	0.999299	93841	66	93808	5331393	56.813
11	0.000644	0.999356	93775	60	93745	5237585	55.853
12	0.000575	0.999425	93715	54	93688	5143840	54.888
13	0.000600	0.999400	93661	56	93633	5050152	53.920
14	0.000711	0.999289	93605	67	93571	4956520	52.952
15	0.000788	0.999212	93538	74	93501	4862948	51.989
16	0.000941	0.999059	93464	88	93420	4769447	51.030
17	0.001055	0.998945	93376	98	93327	4676026	50.077
18	0.001043	0.998957	93278	97	93229	4582699	49.129
19	0.001288	0.998712	93181	120	93121	4489470	48.180
20	0.001410	0.998590	93061	131	92995	4396349	47.242
21	0.001193	0.998807	92929	111	92874	4303354	46.308
22	0.001408	0.998592	92819	131	92753	4210480	45.362
23	0.001597	0.998403	92688	148	92614	4117727	44.426
24	0.001550	0.998450	92540	143	92468	4025113	43.496
25	0.001761	0.998239	92396	163	92315	3932644	42.563
26	0.001689	0.998311	92234	156	92156	3840329	41.637
27	0.001931	0.998069	92078	178	91989	3748174	40.707
28	0.002026	0.997974	91900	186	91807	3656185	39.784
29	0.002096	0.997904	91714	192	91618	3564378	38.864
30	0.001971	0.998029	91522	180	91431	3472760	37.945
31	0.001941	0.998059	91341	177	91253	3381328	37.019
32	0.002326	0.997674	91164	212	91058	3290076	36.090
33	0.002300	0.997700	90952	209	90847	3199018	35.173
34	0.002371	0.997629	90743	215	90635	3108170	34.253
35	0.002293	0.997707	90528	208	90424	3017535	33.333
36	0.002049	0.997951	90320	185	90227	2927112	32.408
37	0.002604	0.997396	90135	235	90018	2836884	31.474
38	0.002702	0.997298	89900	243	89779	2746867	30.555
39	0.002711	0.997289	89657	243	89536	2657088	29.636
40	0.003121	0.996879	89414	279	89275	2567552	28.715
41	0.003219	0.996781	89135	287	88992	2478277	27.804
42	0.005194	0.994806	88848	462	88618	2389286	26.892
43	0.004114	0.995886	88387	364	88205	2300668	26.030
44	0.004380	0.995620	88023	386	87830	2212463	25.135
45	0.005083	0.994917	87638	445	87415	2124633	24.243
46	0.005820	0.994180	87192	507	86938	2037218	23.365
47	0.005988	0.994012	86685	519	86425	1950280	22.499
48	0.006375	0.993625	86166	549	85891	1863855	21.631
49	0.006523	0.993477	85616	558	85337	1777964	20.767
50	0.009205	0.990795	85058	783	84666	1692627	19.900
51	0.008207	0.991793	84275	692	83929	1607960	19.080

52	0.009036	0.990964	83583	755	83206	1524031	18.234
53	0.010945	0.989055	82828	907	82375	1440826	17.395
54	0.012235	0.987765	81921	1002	81420	1358451	16.582
55	0.015744	0.984256	80919	1274	80282	1277031	15.782
56	0.018054	0.981946	79645	1438	78926	1196748	15.026
57	0.019533	0.980467	78207	1528	77443	1117822	14.293
58	0.021508	0.978492	76680	1649	75855	1040379	13.568
59	0.025027	0.974973	75030	1878	74092	964524	12.855
60	0.033550	0.966450	73153	2454	71926	890432	12.172
61	0.036001	0.963999	70698	2545	69426	818507	11.577
62	0.039747	0.960253	68153	2709	66799	749081	10.991
63	0.042139	0.957861	65444	2758	64065	682282	10.425
64	0.047339	0.952661	62687	2968	61203	618217	9.862
65	0.048065	0.951935	59719	2870	58284	557014	9.327
66	0.056609	0.943391	56849	3218	55239	498730	8.773
67	0.057292	0.942708	53630	3073	52094	443491	8.269
68	0.068698	0.931302	50558	3473	48821	391397	7.742
69	0.072841	0.927159	47085	3430	45370	342575	7.276
70	0.085696	0.914304	43655	3741	41784	297206	6.808
71	0.089391	0.910609	39914	3568	38130	255421	6.399
72	0.093934	0.906066	36346	3414	34639	217291	5.978
73	0.107025	0.892975	32932	3525	31169	182653	5.546
74	0.120602	0.879398	29407	3547	27634	151483	5.151
75	0.145019	0.854981	25861	3750	23986	123849	4.789
76	0.136854	0.863146	22110	3026	20597	99864	4.517
77	0.154210	0.845790	19084	2943	17613	79266	4.153
78	0.185080	0.814920	16141	2987	14648	61653	3.820
79	0.195272	0.804728	13154	2569	11870	47006	3.573
80	0.234111	0.765889	10585	2478	9346	35136	3.319
81	0.222622	0.777378	8107	1805	7205	25790	3.181
82	0.247245	0.752755	6302	1558	5523	18585	2.949
83	0.257344	0.742656	4744	1221	4134	13061	2.753
84	0.305504	0.694496	3523	1076	2985	8928	2.534
85	0.317648	0.682352	2447	777	2058	5943	2.429
86	0.300734	0.699266	1670	502	1419	3884	2.326
87	0.371686	0.628314	1168	434	951	2466	2.112
88	0.366246	0.633754	734	269	599	1515	2.066
89	0.366759	0.633241	465	171	380	916	1.970
90	0.414944	0.585056	294	122	233	536	1.822
91	0.440213	0.559787	172	76	134	303	1.759
92	0.453396	0.546604	96	44	75	169	1.750
93	0.332057	0.667943	53	18	44	94	1.786
94	0.565266	0.434734	35	20	25	50	1.425
95	0.411140	0.588860	15	6	12	25	1.628
96	0.476034	0.523966	9	4	7	13	1.416
97	0.640188	0.359812	5	3	3	6	1.249
98	0.432769	0.567231	2	1	1	3	1.581
99	0.451750	0.548250	1	0	1	1	1.405
100+	1.000000	0.000000	1	1	1	1	1.151
	0.868857						

Appendix II. On the DPRK Grain Statistics

In this appendix we clarify the manners we use the DPRK grain statistics in this thesis. To do this we consider three questions about the statistics. First, how available and reliable are official DPRK grain statistics? Second, which outside estimates are most appropriate for the study of the DPRK agriculture? Third, given available official statistics and the best outside estimates, in what manner should we utilise them? The remaining three sections deal with one of these questions separately.

1. The Official DPRK Grain Statistics

We begin by discussing the availability, definition, revision, and reliability of the official statistics.

1.1. Availability

For the period from 1946 to 1962 the DPRK authorities regularly released annual harvest figures.[1] For some years were also published individual grain production figures such as rice and maize as well as other related statistics, including sown areas, fertiliser consumption and farm machinery in use. The data are available from various sources: statistical chapters of *Chosun Joongang Nyungam* (DPRK Central Yearbook: CYB) official statistical publications (DPRK Central Bureau of Statistics: 1961), political leaders' addresses[2], and economic literature[3]. Of them, CYB should be particularly noted for three respects. First, it provides the revised statistics, as

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[1] By 1949 the authorities had annually released official grain statistics in physical terms. Between 1950 and 1954 however statistical announcements became irregular and many competing figures were published by different sources. In particular, there were severe conflicts within the government surrounding official harvest figures from late 1955 to early 1956. The conflicts were finally resolved in 1957 when the authorities corrected all the statistics initially release between 1946 and 1954, announcing a complete new series. Then, statistical announcements returned normal and annual harvest figures were regularly published until 1963 when the authorities stopped releasing all official statistics.

[2] Political leaders' addresses in this period are available from two sources: Kim Il Sung *Jojakjip* (Collected Works) and the ROK Ministry of Unification, *Chosun Nodongdang Dahoi Jaryojip [Collected Materials for the Korean Workers Party Conferences]*, various years.

[3] One of the main sources for official statistics in this period is the articles in official economics journal, including *Gyungje Jisik* (Economy Knowledge) and *Gyungje Gunsol* (Economy Building). These journals published various official statistical reports as well as the articles of government officials that contained official statistics.

discussed later, while some other sources, particularly political leaders' addresses, present the previously released and so inflated figures. Second, it presents time series data that are rare in other sources. Third, it also reports various related data such as sown areas, agricultural inputs and farm labours that are important to crosscheck the reliability of official harvest figures.

In contrast to the years from 1946 to 1962, there are no statistically significant data available from 1963 to 1988. Statistical chapters of CYB have disappeared, and the authorities did not release any specified figures that could be interpreted as official statistics. Of course, insofar as total harvests are concerned, there are some figures available even for this period either in physical terms or in index numbers. These figures could be found in Kim Il Sung's new year addresses as well as in other DPRK publications such as CYB and economics literature. Yet they are far from statistically meaningful numbers. Two quotations would show what these figures typically mean.

> Last year (1976: added) we achieved a great victory in agriculture sector. Despite unfavourable natural weather condition affected by cold-weather front, our diligent agricultural labours and supporters overcame all obstacles and difficulties, taking over the height of more than 8 million tons of *algok* production.[4]

> *Algok* production increased about two times for the 10 years between 1963 and 1974. In particular, we had new take-off from 1973: in that year the production increased to 136% of the year before, and in the next year we increased production to 131% of the 1973 by producing more than 7 million tons of *algok*.[5]

The first quotation says that *algok* (grain) production exceeded 8 million tons in 1976. But the exact figure is not revealed: it could be 8.01 million, 8.5 million, and even more. The second quotation also gives some information on the official grain statistics of 1963, 1972, 1973, and 1974; it remarks the production level of 1974 and the growth rates for three time intervals with the base year of 1974. Nonetheless, since it does not specify the exact figure of 1974, the official statistics for those years still could not be obtained.

As illustrated by these quotations, the DPRK grain figures available between 1964 and 1988 have two features. First, the figures reporting physical outputs have

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[4] *Kim Il Sung Jojakjip*, Vol.32, p.3
[5] Kim Seung Jun (1988), p.509

usually some vague adjectives attached to them; for example, 'more', 'victorious achievements in taking over the heights of ooo tons of grain production' and so on. Second, the figures reporting the growth rates have normally for their base years those when physical outputs are unknown or hardly specified. Given these features, it is questionable that the available figures for 1964-1988 are statistically meaningful data. Though existing researches tend to regard them as official DPRK statistics[6], we would rather conclude that there are no official statistics available for this period.

This statistical blackout lasted until 1990 when Pyongyang media began to announce the country's grain production again. Since then the DPRK authorities have regularly announced annual harvests through official media. Those figures were compiled by a Japanese research (Hirata 1998) that also obtained the confirmation on the figures from a high ranked official in the DPRK government.

And in 1997 the DPRK Agricultural Commission submitted to UNDP official figures about national and provincial production of rice and maize, two main grain items of the country, for the period from 1989 to 1997.[7] The submitted statistics are for several respects distinguished from the other data ever released. First, they have clear definitions. Traditionally, for example, the authorities announced rice production in unhusked physical weights without any concrete definition, which was a reason why outside researchers discounted and revised the officially claimed outputs. By contrast, the submitted figures adopt internationally standardised definitions, reporting rice production both in paddy rice and in milled equivalents. Second, the figures include provincial output figures that had been hardly released since the 1950s. Third, they are time series data that have the longest time interval ever released without any missing years.

1.2. The definition of algok

Appendix table 1 presents the grain statistics released by the DPRK authorities. Several questions could be raised against the data, and perhaps the first question would be about the definition of grain.

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[6] For instance, see the ROK Ministry of Unification, Bukhan Gyungje Tonggyejip [Collected North Korean Economic Statistics], Seoul, 1996; Lee Hy Sang (1999); Choi Su Young (1996).
[7] These figures are available from DPRK/UNDP (1998a)

Appendix table 1. Official DPRK Grain Statistics

(1000 metric tons)

	Algok (grain)	Rice (Paddy)	Rice (milled equiv.)	Maize
1946	1898	1052		156
1947	2069			
1948	2668			
1949	2654	1158		375
1950				
1951	2260			
1952	2450			
1953	2327	1229		224
1954	2230			
1955	2340			
1956	2873	1392		760
1957	3201			
1958	3700			
1959				
1960	3803	1535		950
1961	4830			
1962	5000			
1963	5000			
1964	5000			
1965				
1966	4405			
1967	5110			
1968	5672			
1969				
1970				
1971				
1972				
1973	5343			
1974	7000			
1975	7700			
1976	8000			
1977	8500			
1978	7870			
1979	9000			
1980				
1981				
1982				
1983				
1984	10000			
1985				
1986				
1987	10059*			
1988				
1989	9490*	4320	3240	4340

1990	9000	4480	3360	3900
1991	8900	4090	3067	4200
1992	8800	4450	3337	3720
1993	9000	4750	3562	3940
1994	7100	3110	2177	3550
1995	3500	2000	1400	1370
1996	2500	1410	987	830
1997	2700	1570	1099	1010

* converted into physical outputs from growth rate figures

Source) 1. For all figures between 1946 and 1961, *Chosun Joongang Nyungam*
2. For total grain production [*algok*] between 1962 and 1989, ROK Ministry of Unification *Bukhan Gyungje Tongyejip [Collected North Korean Economic Statistics]*, 1996
3. For total grain production [*algok*] between 1990 and 1997, Hirata (1998)
4. For rice and maize between 1989 and 1997, UNDP/DPRK (1998a)

Since 1946 the DPRK authorities have announced its grain production under the name of *algok* without a clear definition. The literal meaning of *algok* is 'grain' that includes rice, maize, wheat, soybean and other dry-field grains. This literal meaning seems to be applied to the data from 1946 to 1960 in the sense that the data on other important crop items such as potatoes (Irish and sweet) and vegetables were separately collected and announced.

But there are many doubts about whether this literal meaning has been applied to the statistics after 1960. The doubts start from Kim Il Sung's own remarks. For instance, he wrote:

> Securing sown areas for *algok* is important in achieving the target of 10 million tons of *algok* production. Whatever happens, we must secure 600,000 hectares for maize production, 650,000 hectares for rice, 100,000 hectares for sweet and Irish potatoes, and 50,000 hectares for wheat.... Supposing that one-hectare of wheat fields produces four tons, we shall produce 200,000 tons of wheat from these 50,000 hectares. If one hectare of potato and sweet potato fields produces 30 tons, the total output from the 100,000 hectares will be three million tons of potatoes or 750,000 tons of *algok* in the ratio of four to one between potatoes and *algok*. About 100, 000 to 200, 000 tons of beans and other dry-field crops can also be produced.[8]

In the mid 1970s Kim Il Sung himself included potatoes in *algok*, saying that potatoes could be converted into *algok* with one fourth of its physical weights. An interesting

point is that this conversion ratio between *algok* and potatoes was officially introduced in the early 1960s and has been widely used since. For instance, a cabinet decree dated 20th July 1961 shows that potatoes were added to *algok* when co-operative farms reported their production to the government.[9] And a high government official admitted in 1997 that the authorities were adding potatoes to *algok* figures.[10] It seems therefore evident that officially released *algok* figures have included potato production at least since the mid 1970s.

The question is: whether potatoes were the only item that was added to *algok* figures? The above cabinet decree allows small-scale co-operative farms in mountainous areas to add not only potatoes but also vegetables to their *algok* production. And interestingly officially claimed *algok* production suddenly jumped in the early 1970s, reaching 10 million MT in 1984 that was more than three times the level of the early 1950's. Both facts combined could raise concerns about whether other crop items, mainly vegetables, have been included in *algok* figures. Actually Kim Sung Ho and Kim Woon Keun (1983) argued that the officially released *algok* figures since 1973 could be approximated well when both potatoes and vegetables are converted into and added to *algok*. But there are no further available data or information to assess this argument.

From the above discussion three conclusions can be made. First, official *algok* figures had represented only grain production by 1960. Second, however, they have included potatoes at least since the mid 1970s. Third, there is a possibility that vegetables have been also added to the figures.

1.3. Revision

The second question about the DPRK statistics would be: whether are they officially revised or confirmed figures? This question is closely related to the inconsistency problem of the data.

It should be noted that the DPRK authorities have released many numbers that are contradictory to the previously released ones. For instance, the 1975 CYB claimed

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[8] *Kim Il Sung Jojakjip*, Vol. 34, p.19

[9] Cabinet Decree No. 116, On rewarding honours to co-operative farms, cities, townships (districts) that sell more grains to the state, 20 July 1961.

[10] Hirata (1998)

that the grain production of 1974 was more than 7 million tons and this was about two times the 1963 production.[11] According to this claim, the 1963 production must be around 3.5 million MT. However, Kim Il Sung's new year address of 1963 said that the country already 'took over the height of 5 million tons of grain production in 1962', and Chung (1974) pointed out that in the 1960s the authorities reported the 1963 production as high as 5.2 million tons[12]. How are these numbers, which produce more than 1.5 million tons of difference on a single year's output, to be interpreted?

Though there is inconsistency in the available DPRK statistics, it is unlikely that the DPRK economic authorities that need correct numbers to run a highly planned socialist economy have had internally inconsistent data. The existence of inconsistency therefore suggests that the authorities have continued to review and revise initially released figures. Actually there are several reasons to believe that.

First, there is an actually known case of this revision: the 1957 correction of 1946-1954 grain statistics. Between 1954 and 1956 confirming official harvest figures was a sensitive issue. As discussed in chapter 4 of this thesis, the DPRK authorities launched a compulsory grain campaign in November 1954 in order to secure state food reserves for increasing urban population after the Korean War. But the campaign soon failed, being officially ended by the party order on 2 February 1955. And this failure gave rise to political conflicts surrounding agricultural policies within the communist party in December 1995 when Kim Il Sung, prime minister, attacked Park Chang Ok, the head of the State Planning Commission, for setting up on the desk unrealistically high collection targets that cause farmers' resistance. An interesting point is that Kim Il Sung argued that such unrealistic targets were made from inaccurate and falsified official grain statistics. As a result, from early 1956 the statistical authorities began to significantly discount all the initially released harvest figures and finally announced a completely new series in 1957.[13] This case shows: 1) in the 1950s the country already suffered the problems of inaccurate and inflated

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[11] The DPRK Central News Agency, *Chosun Joongang Nyungam [DPRK Central Yearbook] 1975*, 1976. See the same claim of Kim Seung Jun (1988) quoted in the text.
[12] See Table 15 in Chung (1974: p.48). In this table, he presents the DPRK grain statistics between 1963 and 1965 that are slightly different from the figures found in other sources, for instance, CYB. It is not clear which figures –Chung's or CYB's- are more similar to actual official statistics. For consistency, however, we do not use Chung's figures in our appendix table 1, assuming that CYB provides official DPRK statistics.
[13] For the details of statistical correction procedures, see Suh Dong Man (1996)

official statistics, 2) to resolve the problems the authorities attempted to correct and revise initially released official statistics.

Appendix table 2. The Revision of Official Grain Statistics in 1957

	Statistics in Oct. 1954	Revised Statistics in Feb.1957
1946	1998	1898
1947	2178	2069
1948	2809	2668
1949	2795	2654
1950		
1951	2601	2260
1952	2939	2450
1953	3288	2327
1954		2230
1955		2340
1956		2873

Source) Kim Sung Bo (2000), p. 352

Second, the DPRK leaderships have continuously pointed out the exaggeration and falsification of official statistics since the 1960s. This suggests that the correction and revision of initially released statistics may not be the phenomena confined to the 1950s. For instance, Kim Il Sung wrote:

> To make sure the science and objectivity of statistics we have to eliminate the phenomena of false reporting. Currently some organisations and firms tend to report false statistics. False reporting is not rare in agriculture and fishery sector. And construction and industrial sector happen to report false statistics..... In agriculture sector there are found many false reporting in the production of *algok*, vegetables, and fruits.... In particular, there are many cases to exaggerate *algok* production.[14]

Third, the way that grain statistics have been collected and announced in the DPRK raises the possibility of continued revision and correction of the statistics. There are two different harvest-figures in the DPRK: the expected ones and the actual ones. The expected production figures are calculated from per hectare yields, the data of which are obtained from sample field surveys before harvest. And the actual figures are collected from the amounts of crops compiled after harvest. By 1957 the

authorities had used the expected figures as the basis to calculate agricultural tax-in-kind, set collection targets and announce official grain production. And there is no evidence that this routine has changed afterwards. The point is that there are various exaggerating factors in the expected production figures, notwithstanding the inaccuracy caused by surveying only some sample fields[15]. This suggests that the authorities may have two separate production figures with great differences and that, when necessary, they would revise and correct one figures by the other ones. Particularly Kim Il Sung's new year addresses, the primary source for the DPRK grain statistics between 1963 and 1988, seem to reflect the expected production rather than the actual one. If it is the case, the data for this period are more likely subject to afterward revisions and corrections.

This possibility of the continuing revisions and corrections raises a question: whether are the available statistics officially revised or confirmed ones? Given scarce data and information, it is difficult to answer the question. Nevertheless, several implications can be drawn from the above discussion. First, the DPRK statistics until 1957 are more likely the revised and confirmed data in the sense that they were already through the revision. Second, it is not clear whether the *algok* figures between 1958 to 1997 are officially revised and confirmed ones for two reasons: 1) they have been released annually separately, 2) lots of them seem to be the expected production figures. Third, the rice and maize data between 1989 and 1997 are likely the revised figures with official confirmation, 1) because they are time series data released at once in recent year, and 2) because they constitute the basis for the DPRK to appeal for international agricultural aid.

1.4. Reliability

Not considering production collapse in the 1990s, one could find two interesting points suggested by the DPRK statistics: 1) grain production grew rapidly for the last four decades on annual average rate of around 9 percent, 2) the growth rate accelerated after important institutional changes. For instance, the rate rose up from

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[14] *Kim Il Sung Jojakjip*, Vol. 24, p.207-208

[15] For instance, Choi Su Young (1996) and Lee Hy Sang (1999) argue that the expected production is exaggerated in the following ways: 1) calculating per hectare expected yields from sample fields with the best conditions, 2) exaggerating sown areas such as including land borders where no production is carried out, 3) ignoring losses in harvesting and milling processes.

5.4 percent in the early 1950s to 15.4 percent on annual average between 1958 and 1961 shortly after agricultural cooperativisation was completed. And it further increased to 20.5 percent between 1974 and 1975, just after Kim Il Sung was claimed to create *Juche Nongbub* in 1973.

Ironically however these two facts have raised many critiques that the DPRK statistics highly exaggerate actual production. The critiques, though not providing solid evidences, stand on two grounds. First, given the secrecy of the DPRK statistical system, the government's desires to justify its agricultural policies internally and make its achievements look more attractive externally must lead to exaggerating the actual production (Kim Sung Ho and Kim Woon Keun 1983). Second, as the government admits, it suffered permanent over-reporting from below, which intrinsically inflates actual production (Lee Hy Sang 1994: Choi Su Young 1996).

In most socialist countries official statistics had similar exaggeration problems, and there is no reason to assume that the DPRK statistics are exception. But the problem is that in the DPRK little data and information are available to assess the reliability of official statistics while in some other socialist economies a variety of information have allowed many independent researches to evaluate and correct official statistics. [16]

As an alternative, therefore, we consider institutional frameworks where economic agents are involved in making official statistics in the DPRK. We assume three players (the central government, local cadres, and farmers) who have interests in official grain statistics, and examine how their interests have been connected to the statistics. This allows us a small opportunity to peek at the reliability of the statistics[17].

The period between 1947 and 1957

It helps to begin with the period between 1947 and 1957 when individual farm households still controlled their grain marketing. At this time, the central government seems to have two interests concerning official grain statistics. First, it had to justify its socialist agricultural policies, including socialist land reform in 1946 and the

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[16] Regarding the official Soviet Statistics, for instance, see the researches of Wheatcroft, Harrison, and Davis (1994: p.24-37) and Wheatcroft and Davis (1999)

[17] For the detailed discussion of the institutions, see chapter 3-5 and chapter 9 of this thesis

beginning of agricultural cooperativisation in 1953-54. Second, it had to collect surplus grains from farm households in order to feed newly established urban socialist sector and spur industrialisation. Obviously both interests should make the government favour more inflated figures. The interests of local cadres who reported regional production to the centre might not be different. Inflated figures could be an easy and effective way to demonstrate their administrative and political abilities to the centre. But farm households' interests seem quite contradictory. At this time individual farm households had to pay 25 percent of their production for agricultural tax-in-kind and meet, though not compulsory in principle, NKCA (North Korean Consumer Association) grain procurement targets imposed by the authorities. Because their taxes and procurement targets were based on official assessment on their production, they should be strongly against the authorities to exaggerate actual production. This institutional framework suggests that, although the DPRK grain statistics in 1946-57 might be inflated, the extent of inflation must be limited. For, as we see in the 1957 statistical revision, exaggerated statistics must cause farm households' unrest, which in turn should cause political and economic burdens to the government.

The period between 1958 and 1995

From the late 1950s to the early 1960s, however, basic changes took place in this institutional framework. By the early 1960s the government abolished agricultural tax-in-kind and NKCA procurement, two basic institutional channels for state grain collection. Instead, it prohibited farm households from privately selling their grains and confiscated all their surplus grains above their consumption requirements. Cooperative farms that absorbed all farm households in rural areas appeared as the new institutional channel for state grain collection. In cooperative farms, farm households were entitled to keeping aside from their production a fixed amount of grains for their food rations. In return, all the remaining grains were collected by cooperative farms, being eventually sold to state procurement agencies. This means that farm households did not have interests to oppose inflated official grain statistics any more. Quite contrary, now they had strong incentives to exaggerate their production. For cooperative farms grouped individual farm households into several work-teams (and sub work-teams) and gave each team the rights to claim higher share

of total farm income when it produced more grains than targets. Assuming no significant changes in the central government's and local cadres' interests, these farm households' interests mean that there appeared a new institutional framework where all players engaged in making official statistics tended to exaggerate actual production.

This institutional framework had remained surprisingly stable until 1995 when the government officially admitted the food shortages of the country and appealed for international food aid. It suggests that the grain statistics between 1958 and 1995 are more likely overestimated than those between 1947 and 1957. Of course, it is unlikely that official statistics could be inflated unlimitedly even when all economic agents have incentives to exaggerate actual performances. Exaggerated statistics would eventually claim another costs: for instance, the central government may suffer planning failures, and local cadres and farmers would be given more increased targets and be in the long run forced to show actual performances matching the reported figures. Nevertheless, economic agents' sharing interests to overestimate actual production provides a good reason to believe that the DPRK statistics for this period are likely most unreliable.

After 1995

Official grain statistics have been made in a quite different situation since 1995. Above all, it seems evident that the central government has not preferred to exaggerate actual production any more, because inflated official statistics would hamper international food aid that accounted for up to 60 percent of total grain imports and 40 percent of total grain consumption in the country between 1995 and 1998. One might think that underestimation is now the primary concern of the government. Yet underestimation is also unlikely in the sense that the government has faced an external constraint in making official statistics. Since 1995 the government has allowed FAO/WFP field survey teams to visit the country every year and carry out their own surveys on agricultural production. Given that FAO and WFP are two major channels for international food aid, their detection of underestimated official statistics would damage the government's credibility and so weaken its position in aid negotiation. The government therefore should concern more about actual figures, rather than deliberately falsified figures.

Local cadres also seem to become more genuinely interested in actual production figures. Since the mid 1990s local cadres have been increasingly responsible for feeding the population without central support. They have been allowed to independently trade grains with other regions and even with other countries, but instead, when the trade is successful, they had been excluded from central food support. This has several interesting implications on local cadres' interests in official statistics. First, they should now need actual grain production figures to feed the population efficiently. Second, over-reporting is not necessarily beneficial to them in the sense that it would cause more procurement to/less supports from the centre, reducing the amount of grains regionally available. Third, given ongoing food shortages since the late 1980s, under-reporting also has a clear limit: repeated under-reporting could cost local cadres' jobs. It seems therefore evident that local cadres also should be more concerned about accurate official grain statistics.

Exaggerating production is certainly not for farm households' interests, either. In 1996 the government introduced the new sub work-team management system that allows farmers to freely sell their surplus grains when they produce more than their production targets. Because the new system sets production targets on the basis of previous years' production, over-reporting would increase the targets and so reduce the disposable grains of farm households. On the other hand, under-reporting also seems to have a clear limit in the sense that farm households' food rations and incomes obviously depend on their fulfilment of production targets.

In sum, since 1995 all economic agents have been more likely interested in making accurate official grain statistics. It suggests that the grain statistics available after 1995 may provide relatively more reliable figures.

Now it seems safe to make the following conclusions. First, the DPRK grain statistics in 1946-57 could exaggerate actual production, but the extent of the exaggeration must be limited. Second, those between 1958 and 1994 are likely to provide most inflated figures. Third, it is the statistics since 1995 that seem to reflect actual production most accurately.

Appendix table 3. Assessment on the DPRK Grain Statistics

	Period I	Period II	Period III
Availability	<1946 –1962> *algok*, rice, maize figures etc	<1963-1988> *algok* figures only for some years	<1989-1999> *algok*, rice, maize figures
Definition of *Algok*	<1946 –1960> grains	< after 1960 > potatoes added, but exact definition unknown	-
Revision	<1946 –1957> revision in 1957 revised figures available	<1964-1988> revision unknown but likely. Existing figures are not revised figures	<1989-1999> revision unknown. Rice and maize figures are likely revised/confirmed figures
Reliability	<1946 –1957> likely exaggerated but not so much	<1957-1994> relatively most exaggerated	<after 1995> relatively most accurate

1.5. Summary

Appendix table 3 summarises the discussion of this section. In terms of availability, we have relatively complete DPRK grain statistics for two time periods: the period of 1946-62 and that of 1989-99. But the data are rare between 1964 and 1988. In terms of definition, the DPRK *algok* statistics had referred to grain production by 1960. But it has not been the case since then. In terms of revision, the *algok* statistics between 1946 and 1957 and the rice and maize statistics between 1989 and 1997 seem officially revised and confirmed data whereas other available statistics do not. In terms of reliability, the DPRK statistics between 1946 and 1957 and those since 1995 seem to provide relatively accurate figures on actual production.

2. Outside Estimates

The discussion of previous section shows that no reliable official statistics are available at least between 1963 and 1988. This absence of official statistics has made it unavoidable for many researchers to use outside estimates in order to study the DPRK agriculture. In this section we consider two questions concerning those outside estimates: 1) which estimates would be the best alternatives for the missing official statistics, 2) to what extent and in what manner can we utilise the estimates?

2.1. Availability

Currently available are six estimated series made outside the DPRK. First, the ROK Ministry of Unification (MOU) has annually released its estimates since 1975. MOU series is available from the ROK National Statistical Office, Comparison of Economic and Social Aspects Between North and South Korea, various years and numerous MOU publications. MOU says that it has utilised four related data for the estimation: officially announced DPRK figures; weather data; the estimated data on the DPRK agricultural inputs; and particularly per hectare yield data coming from experiment farms that have similar lands, weather conditions, seeds and technologies to those in the DPRK[18]. Second, FAO has published the DPRK production statistics through FAO Production Yearbook since the early 1950s. Though FAO is supposed to publish member countries' official statistics, the statistics should be regarded FAO's estimates (henceforth the FAO1 series) for two reasons: 1) in most figures published between 1961 and 1989 FAO put the footnotes saying that they are FAO's estimates, 2) FAO has corrected and revised the previously released figures almost every year. FAO's

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[18] The ROK Ministry of Foreign Affairs describes MOU's estimation as follows:

> We have collected from various routes the information on annual sown areas for each grain items, per hectare yields, regional harvests. We have also considered weather conditions such like rainfalls, imported or domestically produced fertilisers and pesticides. In addition, we have run experiment farms in Cholwon, the nearest area to the DPRK, which have planted the DPRK varieties of rice and maize.... the outputs of the experimental farms have been used for actual estimation.

estimation process is unknown. Nonetheless, it is generally assumed that FAO1 series is more likely dependent on the DPRK data submitted to FAO.[19] In fact the DPRK has been a member country of FAO since 1971, and researches have found that among various estimated series, FAO1 series provides the most similar figures to the DPRK statistics.[20] Third, another FAO series is available from FAO statistical database. Recently FAO revised all its DPRK related statistics already published between 1961 and 1997 and replaced them with a complete new series (FAO2 series). As discussed later, this new series has two features: 1) for the figures since 1991 it provides the official DPRK statistics, 2) for the figures before 1991 it significantly discounted previously released estimates. Fourth, United State Agricultural Department has made public its estimates on the DPRK rice and maize production between 1980 and 1997. Though the estimates (USDA series) do not include total harvest figures, they also can be used as an approximate for the DPRK grain production in terms that rice and maize are two main grain items dominating the DPRK agriculture. Fifth, Lee Hy Sang (1999) made an independent estimation on the DPRK production between 1982 and 1993 (LHS series). Based on Kim Il Sung's remarks on the country's agricultural production and statistical reporting routines, he identifies factors that could inflate actual production in the DPRK statistics. LHS series is eliminating these factors to reach more realistic figures. Sixth, another independently estimated series is available from Kim Sung Ho and Kim Woon Keun (1983), Kim Woon Keun (1996:1997:1999) and Kim Woon Keun and Jeon Hyung Jin (199a). This series (KWK series) is particularly notable for two respects: 1) it provides the estimates with the longest time period from 1960 to 1998, 2) it is one of the first independent attempts to estimate the DPRK grain production by organising various related information and data in reasonable manners. It utilises similar data and process to those of MOU series. The difference is that KWK series takes the production trends implied by the official DPRK statistics between 1946 and 1960 and uses it for the projection afterwards.

Appendix table 4 presents the currently available estimated series[21]. Among these series, we rule out LHS series from further discussion. This series is directly

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[19] Smith, Heather (1997)
[20] Kim Woon Keun (1996): Kim Sung Ho and Kim Woon Keun (1983)
[21] Besides, there are also some other estimates available: for instance, Choi Su Young (1996), various FAO/WFP's reports about the DPRK food situation in the 1990s, Lee Chan Woo etc (1995). But they are preliminary estimates (FAO/WFP's) that are subject to correction afterward, or employ similar

driven from the officially released *algok* figures between 1981 and 1989. But the *algok* figures are not specified, definable, officially confirmed ones, as discussed in the previous section, notwithstanding the question of their reliabilities. We do not believe that the series driven from such figures is statistically meaningful. Furthermore, LHS series is not based on any officially released figures for the period from 1989 to 1993. Given these two facts it seems unlikely that this series is reliable.

We do not further discuss FAO1 series, either. This is mainly due to technical reasons: as already mentioned, since FAO has revised its figures in FAO Production Yearbook almost every year, it is difficult to identify its actual estimates for certain years[22]. Particularly there are three breaks in the series: in 1961, 1988 and 1994. In those years FAO revised all its previously published estimates and began to make completely new series afterwards. In consequence, FAO1 series consists of four sub-series that have quite different implications for the DPRK production trends: sub-series 1 between 1953 and 1960; sub-series 2 between 1960 and 1991; sub-series 3 between 1988 and 1993; sub-series 4 between 1994 and 1997. Obviously it is difficult and perhaps unwise to establish a consistent series using such different sub-series. Henceforth, therefore, we regard FAO 2 series available from FAO statistical database as the only FAO series.

2.2. Correlation between the DPRK statistics and the estimated statistics

To assess the remaining four outside estimates, we first consider the question of how well they approximate the production trends implied by available DPRK statistics. To do this we construct the index series that reveals the production trend implied by available *algok* figures between 1961 and 1997, and conduct simple correlation tests on this index series and the remaining outside estimates.

As pointed out above, the *algok* figures released after 1963 are not statistically meaningful data. Nonetheless, we assume that these figures could be a rough indicator of actual production trend in the following senses. First, the fact that the DPRK government did not release any figures for many years suggests that it preferred

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estimation processes to those already developed by other researches (Choi's), or make estimation for only some years (Lee's). Thus we do not consider them in this appendix.

[22] The figures of FAO1 series in table 4 represent those that appeared latest in FAO Production Yearbook.

Appendix table 4. Outside Estimates on the DPRK Grain Production

(1000 metric tons)

	MOU	FAO1			FAO2	USDA	LHS	KWK	DPRK (1993=100)
		I	II	III					
1961		4692			3583			3803	54
1962		5106			3725			3568	56
1963		5243			4053			3538	56
1964		5102			4212			3655	56
1965		4923			3707			3788	
1966		5083			4073			3925	49
1967		4623			3787			4058	57
1968			4588		3662			4199	63
1969			5340		4378			4282	
1970	4644		5287		4364			4374	
1971			5432		4499			4475	
1972			5827		4309			4633	
1973			6147		4816		5010	4678	59
1974			6547		5068		5790	4781	78
1975	4953		6745		5246		6360	4869	86
1976	5032		7329		5490		6610	4962	89
1977	5029		7790		5798		7020	5080	94
1978	4988		7780		5798		6520	5208	87
1979	5177		8255		6006		7440	5331	100
1980	3982		8730		5752	3650	7440	5460	
1981	5639		8735		6254	4255	7350	5585	
1982	5996		9000		6523	4420	7850	5715	
1983	5785		9718		6707	4541	7700	5841	
1984	6267		10230		7128	4825	8260	5600	111
1985			10745		7096	4649	8090	5030	
1986			11148		7650	5251	8090	4825	
1987			11564		7558	4882	7930	4952	112
1988	6026		11872	10400	7517	4683	7930	5210	
1989				10345	7824	4822	7770	5482	105
1990	4812			10205	8071	4180	7540	4812	100
1991	4427			10180	8836	3720	7310	4427	99
1992	4268			9872	8681	3600	7090	3898	98
1993	3884				9137	3300	7230	2923	100
1994	4125			4591	7215	3700		3768	79
1995	3451			4245	3787	3300		2006	39
1996	3690			4480	2596	3100		2447	28
1997	3489			3664	2866	3000		2559	30

* USDA series is about the sum of rice and maize production. All other series are about total grain production.

Source) 1. For MOU series, the ROK National Statistical Office, *Comparison of Economic and Social Aspects Between North and South Korea*, various years and Korea Development Institute, *Bukhan Gyungje Jipyojip [Collected North Korean Economic Indicators]*, 1996
2. For FAO1 series, FAO Production Yearbook, various years.
3. For FAO2 series, FAO statistical database
4. For USDA series, USDA web site (http://www.usda.gov/)
5. For LHS series, Lee Hy Sang (1999)
6. For KWK series, Kim Sung Ho and Kim Woon Keun (1983), Kim Woon Keun (1996:1997:1999) and Kim Woon Keun and Jeon Hyung Jin (199a)
7. For DPRK series, Appendix table 1

omitting figures rather than making deliberately falsified figures just for the purpose of announcements when it had bad harvests. Thus officially released figures, though they might be exaggerated, could be assumed as reflecting the statistics the DPRK government actually had. Second, even when officially released figures exaggerate actual production, the exaggerating factors should exist in the same manner between the early 1960s and the mid 1990s when the DPRK agricultural institutions had remained stable concerning the collection and making of official grain statistics. This suggests that the exaggeration problem may not matter when we consider only the trend, not the level. Third, the *algok* figures released between 1963 and 1988 can not be specified due to vague adjectives attached to them. But the risks that occur when we employ the figures ignoring such adjectives could be minimised by transforming the figures into index numbers. Fourth, the figures might be corrected after they were released. But this risks of using the existing figures could be minimised when we set the base year of the index series as late as possible, utilising the growth rate figures released as recently as possible. Fifth, the definition of *algok* has been unknown since 1963. But the available *algok* figures should mainly represent the trend of grain production in the sense that grain must account at least more than 60 percent of total *algok* production even when potatoes, vegetables and even fruits are included in the definition.[23] [24]

The production trends implied by officially released *algok* figures are represented by DPRK series, the index series, in Table 4. The question is, how well do the estimated series approximate this series?

Table 5-A reports simple correlation coefficients between DPRK series and four estimated series. All the estimated series have strong positive correlation with DPRK series. Of them, FAO series has the highest correlation. Interestingly MOU, USDA and KWK series have much higher correlation with each other than they have with DPRK series and FAO series. By contrast, FAO series has relatively low

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[23] According to Kim Sung Ho and Kim Woon Keun (1983)'s estimates, grain production accounted roughly for more than 80 percent of *algok* production in the 1960s and the early 1970s under the assumption that only potatoes were added to *algok* figures. And with the new assumption that not only potatoes but also vegetables and fruits were added to *algok* figures since the early 1970s, grain production comprised around 60 percent of *algok* figures.

[24] Obviously however there remains a problem that the definition of *algok* might be changed even between 1961 and 1997. If it is the case, there must be breaks in the series of the *algok* figures so that we can not establish a consistent trend from the data. In this note, because no information is available about this issue, we simply assume that for the concerning period the definition of *algok* has not changed.

correlation with other estimated series. This suggests that MOU, USDA and KWK series share similar information and estimation processes that FAO series does not adopt.

Though all the estimated series have high correlation with DPRK series, it does not necessarily mean that they all approximate the production trends implied by officially released statistics well. For most economic variables tend to have time trends that could sometimes produce high correlation among them even when they do not actually have any significant economic relationship. The four estimated series and DPRK series prove to have strong time trends: in econometric terms they are I(1) series. This means that high correlation between DPRK and four estimated series could be largely affected by the time trends they share. To eliminate the time trends and obtain genuine correlation, we generate first difference series from the original series and carry out correlation tests on them once more. In econometric terms, first differencing has transformed the original series into I(0) series. In economics terms, first-difference means annual production change. Thus correlation tests on first difference series would reveal which estimated series explain the DPRK annual harvest changes best.

Table 5-B presents simple correlation coefficients among first difference series. The results are somewhat surprising. FAO series has still very high positive correlation with DPRK series: the coefficient is 0.85. But both MOU and USAD series prove to have little relationship with DPRK series, showing the coefficient of 0.36 and -0.12 separately. The coefficient of KWK series is slightly higher, but still not enough to show its close relationship with DPRK series as FAO series does. As in original series, MOU, USDA and KWK series have higher correlation with each other than they have with DPRK series and FAO series.

Several conclusions can be drawn from these results. First, the estimated series could be divided into two groups: one group of FAO series and another group of MOU, USAD, and KWK series. They have high correlation within group, but low correlation outside group. Second, it is FAO series that approximates officially released grain statistics between 1961 and 1997 best. That the correlation coefficient between DPRK series and FAO series is above 0.85 both in their original series and in their first difference series suggests that two series are almost identical in terms of the trend they represent. Third, another group of estimated series, including MOU, USAD, and KWK series, has little relationship with DPRK series. Those series have a

similar time trend with DPRK series but fail to approximate the latter in terms of annual production changes. It suggests that statistically they are not directly dependent on officially released DPRK statistics.

Appendix table 5. Correlation Coefficients: DPRK series and Estimated Series

A. Original Series

	DPRK	FAO	MOU	USDA	KWK
DPRK	1				
FAO	0.882	1			
MOU	0.741	0.360	1		
SDA	0.767	0.513	0.969	1	
KWK	0.752	0.474	0.851	0.795	1

B. First Difference Series

	DPRK	FAO	MOU	USDA	KWK
DPRK	1				
FAO	0.856	1			
MOU	0.368	0.292	1		
SDA	-0.129	0.223	0.842	1	
KWK	0.413	0.371	0.401	0.522	1

2.3. Assessment on MOU, USDA, KWK statistics

With the correlation test results above, we proceed into the assessment of the four estimated series.

Consider first MOU, USAD, and KWK series. These series have been most frequently quoted to discuss the DPRK agriculture, particularly its recent food crisis, which demonstrates that they have been widely assumed as reliable estimates for the DPRK grain production. But the above correlation test cast doubts on this assumption.

Appendix table 6. Grain Production Estimates and the DPRK Food Crisis

(1000 MT)

			92	93	94	95	96	97
Production	DPRK	*Algok*	8800	9000	7100	3500	2500	2700
		Rice+Maize	7057	7502	5727	2770	1817	2109
	FAO	Cereal	8681	9137	7215	3787	2596	2866
	MOU	Cereal	4268	3884	4125	3451	3690	3489
	USDA	Rice+Maize	3600	3300	3700	3300	3100	3000
	Kim	Cereal	3898	2923	3768	2006	2447	2559
Death Rates		(per 1000)		5.5	6.8			9.3*

* the 1998 rate

Source) 1. For production statistics, table 1 and table 4.
2. For the death rate of 1993, the DPRK Central Bureau of Statistics (1995)
3. For the death rates of 1994 and 1998, Watts (1999)

To understand the implications of the correlation test results, we briefly compare these three estimated series with available DPRK statistics and FAO estimates in the country's actual food situation in 1994-1998. Appendix table 6 presents five different sets of statistics on the DPRK production with officially claimed death rates in the 1990s. It is already well recognised that the DPRK has suffered great food shortages since the early 1990s. And increasing death rate show that due to the food shortages the famine condition took place first in 1994 and lasted at least until 1998.

The question is; what implications do MOU, USAD, and KWK series have concerning this food crisis? Consider the production of 1993 that determined the food supply of 1994 when the famine condition first emerged. MOU, USAD, and KWK series commonly provide the figures that grain production sharply declined in 1993 by around 10 percent. Hence, the researches based on these series would conclude that the DPRK famine started with production failures. Quite contrary, however, officially released figures and FAO estimates show that grain production increased significantly in 1993: the production reached its peak in that year. The researches using official figures or FAO series would therefore make a quite opposite conclusion that the famine first appeared in the country without production failure.

What about the production trend in 1994-97? According to MOU, USAD, and KWK series, compared to the 1993 production, grain production between 1994 and 1997 declined by up to around 15 percent. Of course, supposing the bad harvest in

1993, this decline could be disastrous to the already worsened food situation. Nonetheless, it seems far from production collapse. During this period however the famine reportedly hit the whole country, which is consistent with officially claimed death rates doubling up in this period. Reflecting this, most researches based on MOU, USAD, and KWK series tend to argue that the DPRK famine was attributed not to massive production failures but to other factors such as distribution failures[25], the absence of government's will to save victims and resource wastes for military purposes[26] and so on. By contrast, officially released figures and FAO estimates show that grain production completely collapsed between 1994 and 1997. For instance, the production of 1997 was less than one third of the 1993 level. Naturally the researches utilising both figures would argue that the absolute shortages of food caused by massive production failures were the main immediate factor which made the DPRK famine develop in a full scale.

We do not intend to judge which estimates are more realistic. Nevertheless, the above discussion reveals what the correlation test results of MOU, USAD, and KWK series actually mean: 1) those series have different implications on the DPRK production trend from those implied by officially released figures; 2) consequently they would lead to the conclusions that might be quite contradictory to those obtained from officially released figures.

Now the question arises: is it really appropriate to use these series? Of course, an estimated series that has different from official statistical series does not necessarily fail to reflect actual production, particularly when the reliability of the official series is questionable. Nonetheless, we argue, it would be inappropriate and even dangerous to employ MOU, USAD, and KWK series for the study of the DPRK agriculture. There are three simple reasons.

First, it is intuitively difficult to accept that there could be reasonable ways not based on officially released statistics to estimate production in the country like the DPRK that had been almost completely isolated from outside world for more than four decades. For outside researchers to make independent estimation are necessary not only detailed data such as inputs and technologies but also in-depth information about agricultural institutions. In case of the DPRK these data and information are

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[25] For instance, Han (2000)
[26] For instance, MOU (September 1998)

mostly missing. Given that, it is highly questionable to make reasonable estimation not utilising officially released figures.

Second, though the DPRK is not a geographically large country, its natural conditions for agriculture vary greatly according to regions from highly mountainous North East with cold climates to flat South West with mild climates. This regional variation could lead to significant estimation errors when the estimation is made simply at national level. But no regional information is available to outside world, and so it is questionable the reliability of the estimates that are significantly different from officially released figures. The production of 1993 provides a good example. In 1993 the DPRK's neighbour countries, including the ROK and China, suffered large amounts of production losses due to abnormally cold weathers that hit Far East Asia. On the basis of this fact, most outside researchers claimed that the DPRK production must be significantly lower in that year than in the previous years, estimating the decline of 8-10 percent. Even though the DPRK government announced an 'unprecedented good harvest' in 1993, they discredited it highly unreliable without reporting any concrete figures. But the DPRK regional production figures submitted to UNDP (1998a) establish two facts: 1) in 1993 the north-eastern part of the country that were directly hit by cold weathers, North and South Hamgyung provinces, suffered drastic decline of grain production by more than 30 percent, but 2) due to good harvests of other provinces the national harvest increased by more than 10 percent in that year. Though there could be still challenges to these official figures[27], this example illustrates how biased outside estimates could be when they are made simply at national level without appropriate regional information.

Third, agricultural production in the DPRK have been carried out in a quite unique way called *Juche Nongbub* that encourages dense planting and develops various farming practices to prevent the problems of the dense planting. Given that little is known about *Juche Nongbub* and its results, it is questionable how accurately

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[27] It is still arguable how good (or bad) the 1993 harvest actually was. Nevertheless, it is at least certain that the DPRK authorities have made consistent announcements on that harvest. From July to August 1993 Pyongyang media announced the bumper harvest, mainly based on the grain outputs of South West. It was also this region that foreign observers were allowed to visit to see the actual harvest situation. At that time, by contrast, few reports were made on the situation of North East. (For the details, see Radio Press 1993 p.1-5). These reports are quite consistent with the regional output figures submitted to UNDP later in 1997 showing that in 1993 South West had output increase more than 20 percent, and that this increase surpassed the disastrous output decline of North West, leading to national bumper harvest. In this sense, the official announcement of the 1993 bumper harvest seemed to be made at least from the figures the authorities actually had.

outside researchers could estimate the DPRK's agricultural performances, not depending on officially released figures.

In short, we do not believe that there are reasonable ways to estimate the DPRK production independently outside the country, not based on official figures. In this respect we do not think that it would be appropriate to utilise for the study of the DPRK agriculture outside estimates such as MOU, USDA, and KWK series that are significantly different from official figures.

2.4. Assessment on FAO statistics

The above correlation tests show that FAO series approximates well the production trend implied by DPRK series. Given that other estimated series are inappropriate for the study of the DPRK agriculture, this means that FAO estimates may be the only alternative for the missing official DPRK statistics. Further, FAO is the only organisation that has provided a wide range of other DPRK agriculture related statistics from agricultural trades to domestic food distribution. Thus the utilisation of FAO estimates could be practically beneficial as well.

The difficulty however is that we can not use all FAO estimates in the same manner. Appendix table 7 compares FAO statistics with the DPRK statistics. It reveals an interesting point: FAO estimates since 1991 should be regarded as official DPRK statistics whereas those until 1990 should not.

Take a look at the estimates since 1991. Both official figures and FAO estimates provide almost the same figures in maize and paddy-rice. Though rice figures expressed in milled equivalents are significantly different, it is simply because the DPRK and FAO have applied different milling losses in the process of conversion of paddy rice into husked one. This suggests that FAO has actually provided official DPRK statistics. Of course, officially released *algok* figures are different from FAO cereal statistics. But the differences seem natural in the sense that both figures have different definitions and apply different milling losses and conversion rates, notwithstanding the fact that the *algok* figures are preliminary ones reflecting the expected production and so they are likely subjected to afterward revision.

There are also other evidences that FAO estimates are actually official DPRK statistics. For example, as already pointed out, FAO has paid field visits to the DPRK

every year to assess the country's production and collect field data since 1995. This means that FAO has obtained much better and more detailed information on official DPRK statistics than before. Because FAO is supposed to publish member countries' official statistics, this information must be reflected in FAO statistics. Furthermore, the footnotes saying that the DPRK related statistics are FAO's estimates have disappeared in FAO Production Yearbook since 1991, which suggests that FAO has attempted to publish the official DPRK statistics. In this respect we believe that, insofar as the data since 1991 are concerned, currently available FAO estimates are actually official DPRK statistics or at least their best approximates.

By contrast, FAO estimates between 1960 and 1991 do not seem to represent official DPRK statistics at all. Both official figures and FAO estimates share a similar trend. In absolute physical terms, however, they do not have any similarity. For instance, the announced *algok* production reached 10 million tons in 1984 when FAO statistics report mere 7.1 million tons of cereal production. It is difficult to believe that only different definitions and methods of calculation applied to both figures could generate many million tons of gaps between them. Both figures have significant differences in rice and maize production as well. It seems therefore fair to say that FAO estimates between 1961 and 1991 are not official DPRK statistics, even though they might be driven from the latter.

In short, there exists a break in FAO series. Thus we use FAO estimates in different manners according to the time period they represent. First, we regard FAO estimates since 1991 as official DPRK statistics and use them in the same manner with other official DPRK statistics such as *algok* figures between 1946 and 1963 and rice and maize figures between 1989 and 1997. For these statistics, we discuss not only the trend but also the level they represent. Second, we assume that FAO estimates between 1960 and 1991 are completely different statistics from official DPRK statistics. For them, we attempt to identify only the trend they imply. Even the identified trend will be used only when we can provide other related information and data to support them.

Appendix table 7. DPRK Statistics and FAO Estimates

(million metric tons)

	DPRK				FAO			
	Algok	Rice (paddy)	Rice (milled)	Maize	Cereal (paddy)	Rice (paddy)	Rice (milled)	Maize
1961	4.83				3.58	1.81	1.21	1.25
1962	5.00				3.73	1.90	1.27	1.31
1963	5.00				4.05	2.07	1.38	1.43
1964	5.00				4.21	2.18	1.45	1.51
1965					3.71	1.91	1.27	1.32
1966	4.41				4.07	2.13	1.42	1.47
1967	5.11				3.79	1.98	1.32	1.37
1968	5.67				3.66	1.91	1.28	1.32
1969					4.38	2.34	1.56	1.62
1970					4.37	2.33	1.55	1.61
1971					4.50	2.41	1.61	1.67
1972					4.31	2.31	1.54	1.60
1973	5.34				4.82	2.60	1.73	1.79
1974	7.00				5.07	2.71	1.81	1.92
1975	7.70				5.25	2.81	1.88	2.00
1976	8.00				5.49	2.85	1.90	2.20
1977	8.50				5.80	3.06	2.04	2.30
1978	7.87				5.80	2.96	1.97	2.40
1979	9.00				6.01	3.06	2.04	2.50
1980					5.75	2.65	1.77	2.70
1981					6.26	3.05	2.03	2.80
1982					6.52	3.20	2.14	2.90
1983					6.71	3.29	2.19	3.00
1984	10.00				7.13	3.50	2.33	3.20
1985					7.10	3.37	2.25	3.30
1986					7.65	3.81	2.54	3.40
1987	10.06				7.56	3.54	2.36	3.50
1988					7.52	3.39	2.26	3.60
1989	9.49	4.32	3.24	4.34	7.82	3.50	2.33	3.80
1990	9.00	4.48	3.36	3.90	8.07	3.57	2.38	4.00
1991	8.90	4.09	3.07	4.20	8.84	4.12	2.75	4.20
1992	8.80	4.45	3.34	3.72	8.68	4.50	3.00	3.72
1993	9.00	4.75	3.56	3.94	9.14	4.79	3.19	3.94
1994	7.10	3.11	2.18	3.55	7.22	3.18	2.12	3.55
1995	3.50	2.00	1.40	1.37	3.79	2.02	1.34	1.37
1996	2.50	1.41	0.99	0.83	2.60	1.43	0.95	0.83
1997	2.70	1.57	1.10	1.01	2.87	1.53	1.02	1.01

Source) 1. For the DPRK statistics, table 1.
2. For FAO statistics, FAO database electronically accessed at www.fao.org

3. How to use the Statistics

From the above discussion, we can summarise the manners to use the DPRK grain related statistics as follows.

1. For the study of the DPRK agriculture in 1946-1963 we rely on official grain statistics. We employ not only the trends but also the levels the statistics represent. A problem is that the statistics, especially those between 1958 and 1963, might be exaggerated. Thus, when we discuss this period, we provide other related data and information to crosscheck the reliability of the statistics, including official statistics in other related fields such as agricultural inputs, technologies, investments and so forth.

2. There are no official grain statistics available between 1964 and 1988: the existing algok figures should not be regarded as official statistics. Thus, we depend on FAO estimates. In this case, however, we consider only the trends the estimates imply - not the levels.

3. For the period after 1990 we employ two statistics: FAO estimates on total grain production since 1991, and official rice and maize production statistics. We assume that FAO estimates are equivalent to official statistics in the 1990s. For those since 1995 we consider both the levels and trends they imply. Rice and maize statistics are mainly used to identify regional production trends.

4. The algok figures available between 1963 and 1997 are regarded only as a rough indicator of the production trends under the assumption that they separately fail to reflect actual production. And we do not make any important arguments based on these figures.

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